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THE SURGICAL CLINICS OF NORTH AMERICA

Volume 2

Number 6

CLINIC OF DR EVARTS A GRAHAM

BARNES HOSPITAL

CASE I. A CASE OF FAMILIAL HEMOLYTIC ICTERUS ASSOCIATED WITH PULMONARY TUBERCULOSIS AND OLD TUBERCULOSIS OF THE HIP SPLENECTOMY CHOLECYSTECTOMY RELIEF FROM JAUNDICE

THIS first patient is a young man twenty eight years old a clerk by occupation who came to the hospital to see Dr Allison because of an old tuberculosis of the left hip which has been present for eighteen years Do you notice anything unusual about his appearance except for the old sinu es about the hip

FIRST STUDENT He is jaundiced

DR GRAHAM Yes he says he has been jaundiced continuously for eight year Do you suppose the jaundice has any thing to do with his tuberculosis?

SECOND STUDENT Probably not because if it did it would seem to indicate a very extensive tuberculous lesion of the liver or of the bile tract which could hardly continue for as long as eight years I do not think he appears sick enough to have so extensive a lesion Such extensive tuberculosis of the liver is also rare

DR GRAHAM What would you suggest as possible causes of his jaundice?

THIRD STUDENT Stone in the common duct cirrhosis of the liver syphilitic hepatitis malignant tumor of the liver

DR GRAHAM It would be very unusual to have a stone in the common duct which would result in the presence of jaundice continuously for eight years Jaundice in such cases is usually

intermittent and it is likely to be associated with evidences of acute infection at times such as chills fever nausea and vomit in^g pain etc This patient has never had any symptoms such as those which we would expect from such a condition More over cases of stone in the common duct are rare in one so young as he was at the onset of his jaundice ei ht years a o (twenty years old) If the jaundice were due to a cirrho^s of the liver we should expect evidences of ascites after ei ht years as well as other classical signs of portal obstruction but we cannot detect any of these findin^gs There is no special evidence of a syphilitic hepatitis There is no syphilitic history the Wassermann test is negative and there are no findin^gs which are particularly suggestive of a syphilitic infection A malignant tumor involving the liver or the bile passages need hardly be considered seriously because of the chronicity of the jaundice A rather common characteristic of carcinoma of the head of the pancreas is constant painless jaundice but we should not expect such a case to last f r ei ht years Similarly al o we need hardly consider a liver abscess becau e of the chronicity of the icteru and because he pre e nts no e vidence of an e ten^{ive} suppurative process except for the dischargin^g sinuses about the hip Hist temperature since entrance (ei ht day a o) has been normal except once when it reached 100 F (37.8 C) and his leukocytes ha e varied between 6700 and 8000 Now all of th^{is} condition which we have mentioned produce jaundice by ob t uction of some bile channel either those within the liver or the lar e extrahepatic ch nnel as for e ample th^{is} common bile-duct In ll^{most} such case we expect to find bile n the urine and we also often find that the stool tend to a un e the li^{ght} clay color becau e of the e c^{cess} of undi e t d fat a d the ab e nce of the bile pigments In thi case h w^{ow}er e m^{en}tions of the urine on four d ff rent days h e f led to re eal the prese ce of bile by o dinary chemical te t althou h the urine l hly brown h n col r Lik w e the stool ha e shown no abnormal ty in c lor Is jaundice ver found due to y otl e cau es than actual ob t ruction of the bil ary chann l

STUDENT It may b d s m t m e t hemoly

DR GRAHAM Yes in any condition in which there is rapid hemolysis jaundice is likely to be present. If for example a patient receives a transfusion of incompatible blood he is likely to become jaundiced. Even hemolytic jaundice however is thought by many to be obstructive in its last analysis. There is much controversy on this point. There is a condition in which hemolysis occurs from unknown causes associated with jaundice often of many years duration and characterized by its occurrence in families. This condition is usually known as familial hemolytic icterus. Other characteristics of this condition are an enlargement of both the liver and the spleen absence of ascites a secondary anemia an increased fragility of the red blood corpuscle to hypotonic salt solution and absence of bile pigments in the urine despite the jaundice although urobilinogen may be present. Now let us examine the patient and go further into his history.

We find on examination of the abdomen that the lower edge of the liver can be felt about 4 inches below the costal margin. It is not tender. The spleen can be made out easily with its lowest point on at the level of the umbilicus. It feels firm and is not tender. Both lungs present evidence of pulmonary tuberculosis both on physical examination and by x-ray. It seems however not to be very active and repeated examinations of the sputum have failed to show tubercle bacilli. His complement fixation test for tuberculosis is 2+. His blood examination shows a rather high grade anemia. On three different occasions the red cells have been 2,100,000, 1,400,000 and 1,900,000. The hemoglobin rather strangely has been higher than we would expect namely 80, 80 and 75 respectively. The leukocytes have varied between 8000, 4000 and 6400. Despite the high color index no nucleated red cells were found in repeated examinations. An average of several differential counts made on different days showed Polymorphonuclears 59 per cent lymphocytes 29 per cent large mononuclear and transitionals 5 per cent polymorphonuclear eosinophils 2 per cent unclassified 5 per cent. The clotting time is three and a half minutes. Test of the fragility of the red cell to hypotonic NaCl solution made

intermittent and it is likely to be associated with evidences of acute infection at times such as chills fever nausea and vomiting pain etc This patient has never had any symptoms such as those which we would expect from such a condition More over cases of stone in the common duct are rare in one so young as he was at the onset of his jaundice eight years ago (twenty years old) If the jaundice were due to a cirrhosis of the liver we should expect evidences of ascites after eight years as well as other classical signs of portal obstruction but we cannot detect any of these findings There is no special evidence of a syphilitic hepatitis There is no syphilitic history the Wassermann test is negative and there are no findings which are particularly suggestive of a syphilitic infection A malignant tumor involving the liver or the bile passages need hardly be considered seriously because of the chronicity of the jaundice A rather common characteristic of carcinoma of the head of the pancreas is constant painless jaundice but we should not expect such a case to last for eight years Similarly also we need hardly consider a liver abscess because of the chronicity of the icterus and because he presents no evidence of an extensive suppurative process except for the discharging sinuses about the hip His temperature since entrance (eight days ago) has been normal except once when it reached 100 F (37.8 C) and his leukocyte have varied between 6,000 and 8,000 Now all of the conditions which we have mentioned produce jaundice by obstruction of some bile channels either those within the liver or the larger extrahepatic channel as for example the common bile duct In all such cases we expect to find bile in the urine and we also often find that the stools tend to assume the classical clay color because of the excretion of undigested fat and the absence of the bile pigments In this case however examinations of the urine on four different days have failed to reveal the presence of bile by ordinary chemical tests although the urine is slightly brownish in color Like so the stool has shown no abnormality in color Is jaundice due to any other causes than actual obstruction of the biliary channel

STUDENT It may be due sometimes to hemolysis

large number of these cases subjected to operation Elliott and Kanavel¹ who were the first to report a case in this country subjected to operation found altogether in the literature up to 1915 that 48 cases of hemolytic icterus had been operated on Of these however only 23 were of the familial type With the exception of 2 cases who did not survive the operation all of the 48 cases were relieved of their jaundice and their anemia

The question which confronts us in this case is whether this man is a suitable risk for splenectomy Should his tuberculosis be considered as a contraindication? Now the operation of splenectomy in itself is not a particularly serious one Some cases may be very difficult because of the presence of very extensive adhesions but other cases are easy One cannot tell definitely about how difficult a particular case is going to be unless a laparotomy is performed The patient has but a slight chance to overcome his tuberculosis as long as he continues to be anemic The best way to improve the anemia of a patient who has hemolytic icterus is to remove his spleen I feel therefore that splenectomy in this case is doubly indicated (1) because it should relieve him of all symptoms of the hemolytic icterus and (2) because by relieving him of his hemolytic disease we shall be giving him a better chance to combat his tuberculosis We have explained to him the added risk of splenectomy in his case but he is eager nevertheless to have the operation Is there anything that we can do in preparation for the operation which might make the risk less?

STUDENT Give him a blood transfusion

DR GRAHAM Yes It seems to me that a transfusion of blood is indicated not only because of the anemia but also because of his jaundice Patients with chronic jaundice usually go through an operation better if they have a preliminary transfusion This is particularly the case if with the jaundice the clotting time is seriously prolonged In this case however the blood clots in three and one half minutes well within the normal limits His blood has already been grouped and has been found

Elliott C A d Ka I A B Spl t my f H m lyt I t
S g Gy d Obst 1915 xx p 21

on two different days gave identical results hemolysis began at a dilution of 0.55 per cent and was complete at 0.45 per cent. Rolleston states that normally hemolysis of the red blood corpuscle begins in 0.42 per cent NaCl solution and is complete in 0.3 per cent. In our case then it is evident that rather a marked increase in the fragility of the cell exists. Other observations which have been made on him are that his basal metabolism is increased 38.9 per cent and that his blood pressure is 135/80. When we inquire further into the history we find that several members of the family have had a chronic jaundice. These include the father, mother, the father and one of the patient's brothers. All of these members of the family were all considered to have enlarged livers. The jaundiced father died at fifty-nine years of heart failure. The jaundiced brother died at twenty-four with what was diagnosed as leukemia. The diagnosis is tentative because it indicates that the spleen was enlarged. The condition therefore was almost certainly the same as that presented by our patient. There are two other brothers both of whom are in good health, one at thirty-eight years and the other at twenty-one. There are no sisters. We have then a patient with chronic jaundice for eight years, the third known generation of jaundice in his family, with an enlarged spleen and liver, a secondary anemia, an increased fragility of his red cells and an absence of bile pigments in his urine. These features establish the diagnosis of familial hemolytic icterus. Can anything be done for him?

FIRST STUDENT: I think that splenectomy is merited alone for this condition.

DR. GRAHAM: There is probably no other condition in the whole field of surgery in which such strikingly dramatic results can be obtained as can be accomplished by splenectomy in familial hemolytic icterus. The jaundice which may have been continuously present for from ten to twenty years disappears a few days after the operation and returns again. At the same time also the anemia greatly improves. These facts suggest strongly that some toxic hemolytic agent is either present in the spleen or is excreted from the spleen. There have not been any

care is exercised to avoid it. The stomach also might easily be injured. We have the pedicle isolated now. We can either ligate the vessels now before removing the spleen or clamp the pedicle with large clamps and remove the spleen before the ligation. I think the latter is the easier method because the large spleen is then out of the way. The spleen is now cut away and we can make a satisfactory ligation of the clamped pedicle. We are ligating the artery separately and then behind that ligature we are taking several suture ligatures through the whole pedicle. We have used No. 2 plain catgut for this purpose. We now have all the clamps off and as you see there has been no hemorrhage. We shall now explore the right side of the abdomen. In addition to the large liver we find the gall bladder to be full of stones. This is not an uncommon accompaniment of hemolytic jaundice. The stones are small and are probably chiefly pigment stones. I am unable to feel any stones in the common duct. The gall bladder wall seems thickened but there are no adhesions. We shall proceed to remove the gall bladder. It is a little more difficult of course to do a cholecystectomy through a left rectus incision. We now have the junction of the cystic and common ducts nicely isolated. We place two clamps on the cystic duct and cut between them. The gall bladder is now being removed from below upward. The stump of the cystic duct is transfixed and tied with No. 1 chromic catgut. The peritoneal reflection is now sewed over the site of the gall bladder. We are now removing a small piece of liver for microscopic examination. The appendix appears normal and we shall not take the time to remove it because the mesentery of the cecum is short and it would be a little difficult to do the appendectomy from the left sided incision. We have now made a layer closure of the wound with a small piece of rubber tissue leading to the stump of the cystic duct. The whole operation has taken only fifty minutes. The patient's pulse is excellent and the anesthetist tells me that his blood pressure is 120. You will notice that we gave this man ether. I have used ether in a good many cases in which the patient had an old pulmonary tuberculosis and I have never seen any serious effects from its use. This has also been the

to belong to Group IV (Moss classification). He will be transfused today by the syringe method (Lindeman) and in a few days he will be operated on unless he should have such a severe reaction following the transfusion that we should decide to wait longer. Until about a year ago most of our transfusions were done with the citrate method and very often the transfusion was followed by a hard chill with high fever. Since using the Lindeman method however which allows the injection of whole blood without citrate we have not had any severe reactions.

(The patient received a transfusion of 500 c.c. of blood by the syringe method of Lindeman. There was no unfavorable reaction. On the next day after the transfusion the blood count was: red cells 4,680,000, the leukocytes 8,840 and the hemoglobin 80. Three days later the patient was operated on.)

DR. GRAHAM. We shall make an incision on the left side of the abdomen similar to a gall bladder incision on the right side. The left rectus muscle is split longitudinally just medial to the center of the muscle. The upper end of the incision is carried upward and medially parallel to the ribs. The peritoneum is now opened and the large spleen comes plainly into view. You will notice also that the liver is very much enlarged. On the surface of both the spleen and the liver there are several whitish areas slightly larger than the head of a pin. These are undoubtedly tubercles. It is not uncommon to find tubercles on the surface of both the liver and spleen during the course of a laparotomy. Fortunately there are not many adhesions about the spleen so we shall proceed to the splenectomy. We work from the right side of the patient by preference. There are a few adhesions posteriorly which we shall clamp and divide. This structure which prevents complete mobilization of the spleen is not an adhesion but a normal attachment between the spleen and the splenic flexure of the colon. We are now dividing it between clamps. It is not possible to deliver the organ outside of the body. You see that it is about four or five times as large as the normal. We now turn it to bring the posterior surface into view. This important condition is to avoid injury to the pancreas. It is very easy to remove a portion of the pancreas unless

thickened the mucosa was not ulcerated Microscopically there was noticeable not only an increase of the fibrous tissue but also rather a marked infiltration of the wall with small round cells The piece of liver showed an infiltration of the portal areas with round cells This was only moderate in extent There was also an increase in the fibrous tissue and particularly in the capsule)

Subsequent History —Three months later the patient reported by letter that he was still free from jaundice but that he felt that he had a little fever nearly every day He also still had a cough There has been no blood examination since he left the hospital

experience of other surgeons who have experience with tuberculous cases has been rather extensive. We ordinarily prefer to use nitrous oxide for such cases. We didn't use it here because we felt that it was desirable to be sure of having a satisfactory relaxation so that the operation would not be prolonged. I have seen no marked difference between ether and nitrous oxide anesthesia on old pulmonary tuberculosis. It is not uncommon to have a slight flare-up with any operative procedure on a patient with pulmonary tuberculosis regardless of the anesthetic used.

(On the day following the operation the blood count was red cells 4 000 000 leukocytes 32 000 hemoglobin 80. The high leukocyte count is an effect nearly always observed after splenectomy. The count gradually came down during the next few days. On the eighth postoperative day the jaundice was entirely gone the wound was healed and the sutures were removed. A test of the fragility of the red cells on the ninth postoperative day showed that in this respect they had returned to practically a normal condition hemolysis began at 0.475 per cent NaCl and was complete at 0.375 per cent. This prompt return is unusual according to the reported cases. In some of the cases collected from the literature by Elliott and Kanavel the fragility of the red cells was still abnormal even years after the splenectomy. The patient had what seemed to be a temporary slight flare-up of his pulmonary tuberculosis with a temperature on one day of 103° F. He raised sputum during this time but no tubercle bacilli could be found in repeated examinations. He was discharged on the sixteenth day in excellent condition.

The spleen weighed 800 grams (1 pound) about four times the normal weight. It measured 12 × 6 × 20 cm. No striking characteristics were noted in the cut surface or in microscopic sections. The esophageally characteristic pathology of this condition. The gall bladder measured 10 cm. in longest and 3 cm. in widest diameters. There were very many (thousands) of small stones of various sizes. Some of them were almost like sand except that the color was very dark. They crumbled easily in the fingers. The wall of the gall bladder was moderately

CASE II. HERNIA OF THE LUNG AND ADENOMA OF THE THYROID

DR GRAHAM The second case is a man thirty eight years old who entered the hospital because of a curious swelling of his neck. The most curious aspect of the condition is that the patient can make the swelling appear and disappear at will. I shall now ask him to demonstrate this feature to you and I desire to call your attention particularly to the manner in which he makes the swelling increase in size. When he attempts to expire with his mouth and nose closed a large swelling appears above the clavicle in the midline so that he presents the appearance of having a moderately large goiter. You will note that the lower part of the swelling is well above the clavicle. Now when he reverses this performance by attempting to inspire with the nose and mouth closed the swelling completely disappears. It is not necessary that he actually close his nose and mouth. Closure of the glottis is sufficient in itself if accompanied by attempts at expiration and inspiration respectively. If we examine the mass we find that it is not tender, it is boggy, but does not fluctuate and of course it is not at all fixed in position. When we get the patient's history we find that he is a Swiss, that he is a clarinet player and that he first noticed the swelling seven years ago while playing the clarinet. Since that time it has gradually increased in size. He is now always conscious of its presence. It is slightly painful at times and occasionally he thinks it causes a slight disturbance of respiration. The ordinary physical and laboratory examinations show nothing noteworthy. What further work would you want to do to establish a diagnosis?

FIRST STUDENT I think it would be well to have an esophagoscopic examination made because it is possible that a diverticulum of the esophagus might produce this picture.

DR GRAHAM If he had a diverticulum of the esophagus we should expect to get a history of a definite disturbance in swallowing. Usually a patient who has a diverticulum of the esophagus

complains of difficulty of swallowin_g and has some regurgitation of food This patient has never noticed anythin_g of that sort However we should of course carefully exclude the possibility of a diverticulum Is there any other method by which a di



Fig 584--Lat l y h g l g p j t g p d t k f
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th l g t sc d ll bo th mddl fth g t h h m k d
by th hea y rr g l l th l ft

vert culum of the esophagus can be demonstrated than by direct esophag_oscopy?

FIRST STUDENT It could be demonstrated with the x ray by means of a b num meal



Fig 580—M h n po t
lly p d



Fig 581—I crease in iz h in
fl t d by pat t



Fig 58 —F t view I mass
fl t d



Fig 83 —M mad d sappe
p ra

complains of difficulty of swallowing and has some regurgitation of food. This patient has never noticed anything of that sort. However we should of course carefully exclude the possibility of a diverticulum. Is there any other method by which a di-



Fig 584.—Lat. l. y. h. gl. g. p. ject. g. p. d. t. k. f. a. d. ta. f. m. h. h. bo. th. l. l. O. d. t. th. t. p. f. th. l. g. se. sc. d. ll. bo. th. m. dd. f. th. g. t. wh. h. m. k. d. by. th. h. vy. g. l. l. th. l. ft.

verticulum of the esophagus can be demonstrated than by direct esophagoscopy?

FIRST STUDENT. It could be demonstrated with the x ray by means of a barium meal.

DR GRAHAM Yes that is the easiest method Now as a matter of fact he has had a barium meal and Dr Lanmore has reported that the pathology seems to be outside of the esophagus At the time that the pouch is inflated the esophagus shows a stasis at the level of the second dorsal vertebra but this is promptly relieved when the patient make the mass disappear Another interesting finding with the fluoroscopic examination is that there is an air containing area extending upward from the usual position of the anterior right apex of the lung An examination of the trachea with a bronchoscope by Dr Arbuckle showed that there was no abnormality there We are probably therefore not dealing with a diverticulum of the esophagus nor with any congenital or acquired pouch from the trachea Is any other diagnosis to be considered?

SECOND STUDENT I think that very often an intrathoracic goiter can be pulled up into the neck I do not know however how to explain the apparent feeling of air which the mass presents on the basis of an intrathoracic goiter

DR GRAHAM We must seriously consider the possibility of a goiter in this case When we examine the mass very carefully we find that although as a whole it is boggy as if it might contain air nevertheless in the anterior portion there is a fairly firm mass which could perhaps be in an anterior position to the air containing mass The fact that the man is a Swiss would perhaps lend some color to the idea of a goiter because of the prevalence of goiters in Switzerland It seems difficult however to reconcile the history and the x ray findings on the basis of a goiter alone Let us ask the patient a little more about his history Tell us please how you first happened to notice the swelling

PATIENT About seven years ago while I was playing the clarinet my partner told me that my neck was swelling up I took a looking glass and saw that when I blew on the clarinet my neck grew much larger but it did not hurt me

DR GRAHAM It seems to me that this history is so striking that you must consider very seriously the fact that there is apparently a rather sudden onset which occurred while blowing against resistance Could you think of a possibility of a combination

tion of a goiter with something else in the neck which contains air?

FIRST STUDENT I suppose one might think of an extension upward into the neck of the lung

DR GRAHAM Yes one could think seriously of a hernia of the lung in this case but is this the usual location of a hernia of the lung?

FIRST STUDENT I think that most hernias of the lung occur in some intercostal space usually at the site of some trauma

DR GRAHAM What you have said about the site of lung hernias is true Some cases however have been reported in which the hernia occurred in either one of the supraclavicular fossæ It seems to me that in this case a diagnosis of a goiter (probably an adenoma) in addition to a lung hernia in the right supraclavicular fossa would explain all the features We have advised this man to have an operation We shall proceed with it now

Operation—We shall perform the operation with local anesthesia because we shall probably wish the man to inflate the lungs during the course of the operation We shall make an incision along the anterior border of the right sternocleidomastoid muscle You see by a little separation of the muscles we come down to the right lobe of the thyroid gland We retract the sternocleidomastoid muscle and the large vessels outward We cut the sternohyoid and sternothyroid muscles between clamps We now have the right lobe of the thyroid well exposed and it is very evident that it is considerably enlarged probably about three times as large as the normal It is also roughly spheric We shall remove it not only because it is definitely diseased probably adenomatous but also because it prevents us from obtaining a proper exposure of the structures behind it We have now clamped most of the vessels going to the capsule of the thyroid gland including the branches of the superior and inferior thyroid arteries and we shall now cut off the right lobe taking care to keep away from the site of the recurrent laryngeal nerve We shall now ask the patient to perform the usual attempt to inflate his neck You will note that

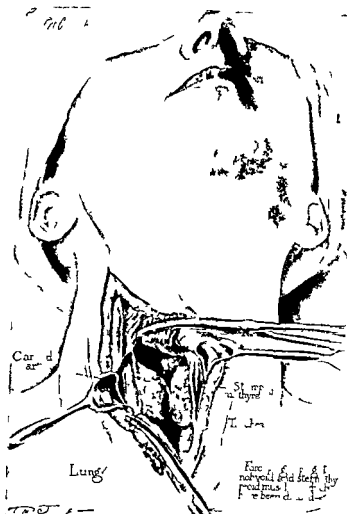


Fig 585 — k t h perat h g po f h m ft l f
tl gh l be f th th l

on each inflation mas com s up h h in th neck. The continuous with someth n in th th ax and wh n I feel t t crepitates e actly as does l g ti ue. It mpo ble to d m n

strate parietal pleura over the mass and yet there is no opening into the pleural cavity. Each time the patient inflates the mass it seems to distend although apparently it is attached to the parietal pleura at a point about at the level of the clavicle. Normally as you know there is a layer of fascia at the apex of the pleura known as Sibson's fascia which strengthens the pleura in this region. The hernia in this case has apparently come



Fig 586 The patient
front



Fig 587—The patient
profile
right neck

through Sibson's fascia and has separated the pleura widely. The parietal pleura however has become adherent to the lung a little below its apex. I do not think it would be advisable to attempt to separate the lung from the parietal pleura at the place of its adhesion because I doubt if any definite layer of pleura could be found sufficient to cover the defect. We shall try instead to see if we can cover the defect with muscle. This however seems impossible. One other possibility of repair

exists that is to put firm packing against the lung and hope that sufficient scar tissue will form to hold it firmly in place. We shall accordingly put a fairly firm packing of iodoform gauze against the lung and we shall caution the patient not to cough or strain during the next few days. The divided muscles have now been sutured and the iodoform gauze pack has been inserted. We shall suture the skin incision down to the small corner from which the iodoform gauze projects. The patient has had no pain during the operation and because he has been conscious it has been much easier to demonstrate the hernia satisfactorily.

Subsequent Course—There was no infection in the wound. The gauze was removed on the fifth postoperative day and the wound was allowed to heal. Patient was seen again at intervals of one month and two months following the operation. He could no longer produce a swelling in his neck as before and his symptoms were gone.

CASE III A CASE OF LUNG ABSCESS DUE TO THE FRIEDLANDER BACILLUS

THE next patient presents an interesting problem both in diagnosis and treatment. You will see that he is very dyspneic and cyanotic, he has to be propped up high in bed. His extremities are bathed in cold sweat. His pulse is about 130 but of fairly good quality. In short, he presents a picture typical of extreme intoxication.

We find from the history that he is thirty-eight years old and an iron molder. Two weeks ago he began to have what he thought was a bad cold. At that time he had fever, pain in the epigastrium and vomiting. On the next day he developed sharp pain in the right chest which was intensified by respiration. He was nauseated without vomiting, had headache, cough and bloody sputum. What does this history so far suggest?

FIRST STUDENT: Pneumonia.

DR. GRAHAM: Is it common to have pneumonia begin with pain in the epigastrium and vomiting as occurred in this case?

FIRST STUDENT: Yes, I think it is common.

DR. GRAHAM: Yes, it is so common that not infrequently a laparotomy is performed by mistake in a case of early pneumonia. No patient should be considered as having an acute abdominal infection until after the chest has been carefully examined. Perhaps it is fortunate for this man that he was not seen by a doctor during the time of his abdominal symptoms. He entered the hospital a week ago on the eighth day of his illness. At that time examination revealed a marked lag of the entire right side of the chest which was most marked in the upper portion. There was diminished resonance in the upper anterior portion with distant breath sounds and many moist râles. Posteriorly from the angle of the scapula to the apex there was a marked dulness and coarse breath sound with many high pitched râles. Below this area the breath sounds were relatively normal. The left lung was normal on physical examination.

The heart had no abnormal sounds and the rhythm was regular. There was moderate rigidity over the entire right upper quadrant of the abdomen. The liver was palpable to a distance of about 2 fingerbreadths below the costal margin. The sputum consisted of thick creamy material which frequently contained a small amount of blood. No elastic tissue fibers and no tubercle bacilli were found. Some of the sputum was inoculated into the peritoneal cavity of a guinea pig and a culture of the exudate made by Dr. Kinsella after the death of the pig showed a pure growth of the Friedlander bacillus. The leukocytes during the first few days varied between about 15,000 and 20,000. The hemoglobin was 75 and the red cell 3,580,000. The temperature varied between about 101° and 104° F (38.2° and 39.8° C) and the pulse between 100 and 130. X-ray examination showed a shadow of irregular density above the third rib. In this region there were areas of air containing lung. It has been two weeks now since the onset of the illness and his general condition has grown steadily worse. He is distinctly more toxic and more dyspneic than when he entered the hospital. What would you suggest as a possible explanation of the increased severity of his symptoms?

FIRST STUDENT Empyema

DR. GRAHAM The possibility of an empyema should always be considered as a complication or a sequel of pneumonia. Many cases of so-called unresolved pneumonia are really empyema. How shall we determine whether this man has an empyema or not?

FIRST STUDENT Use an aspirating needle and syringe

DR. GRAHAM The final diagnosis of empyema depends upon the finding of pus with a needle but before using the needle we should examine the patient carefully both by ordinary physical means and with the x-ray that we shall know here to insert the needle. Remember that the pneumonia apparently involved the right upper lobe where will you expect to find the pus?

SECOND STUDENT It might be the nonthoracic general pleural cavity or walled off and limited to a certain part. If it is in the

general pleural cavity we should expect to find evidence of fluid in the lower portion and extending upward perhaps far enough to reach the upper portion of the pleural cavity

DR GRAHAM When we examine the patient now we find the area of dulness and of physical signs has increased downward



Fig 538 — Ray (pat t ttm f t t h p t l

somewhat but that it is still limited to the upper portion of the lung. There is no dulness at the base of the lung. An x ray examination made today shows a large opaque area which extend from the apex down to the level of the eighth rib posteriorly at which point it is clearly defined by a well rounded border extending from the mediastinum to the lateral chest

wall About its midpoint and overlying the body of the scapula there is a large ovoid irregular area of decreased density Does the shadow which you see on the plate indicate an empyema of the general pleural cavity?

SECOND STUDENT No but it might be a localized empyema

DR GRAHAM Yes we must consider the possibility of localized empyema Such an empyema may be in an interlobar fissure or it may be between the parietal and visceral pleurae but walled off by adhesions from the rest of the pleural cavity Sometime gas or air is found so that the combination of a fluid level with a rarefaction which may be present in an interlobar empyema may simulate closely an abscess of the lung parenchyma in communication with a bronchus This is not a point of much practical difference except from the standpoint of prognosis which is better in the cases of interlobar empyema An argument of perhaps some weight against a diagnosis of empyema in this case is that the pneumonia is very evidently due to the Friedländer bacillus (*Bacillus mucosus capsulatus*) as shown by the guinea-pig inoculation referred to previously Although this organism has been found in empyema pus it is very rare In a series of 574 cases of pleural effusion which we studied bacteriologically at the Mt Sinai Hospital Wlenky reports that the bacillus was found only twice

Jaeger found it not only in empyema pus but also in pericardial effusion Since the incidence of pneumonia due to the Friedländer bacillus is very much higher than this it seems probable that empyema is rare in this type of infection Indeed most cases probably die before a frank empyema has had time to develop Could the condition be anything else than an empyema?

THIRD STUDENT It might be a lung abscess

DR GRAHAM That is to be very seriously considered On the other hand a lung abscess due to the Friedländer bacillus

are uncommon. It is much more common to find multiple small abscesses with this organism. We also cannot exclude positively a tuberculous cavity of the lung. The ovoid irregular area of decreased density in the region of the scapula is strongly suggestive of liquefaction of the mass. This might be



Fig 589—Anteroposterior view of the chest showing the ovoid area of decreased density in the region of the scapula.

due either to a tuberculous infection or a pyogenic abscess. Repeated examinations of the sputum, however, have failed to reveal tubercle bacilli. The rather sharply defined lower border of the whole mass, seen plainly in the x-ray plate, might suggest a tumor or an echinococcal cyst of the lung, but at any rate

Iodin or a light application of the cautery will accomplish the same result. At any rate regardless of what method is used it is desirable to wait for three or four days between the starting of the adhesion and the drainage of the abscess in order to insure sufficient strength and extent of adhesions to prevent leakage of pus into the pleural cavity. Fortunately in perhaps most cases the lung is already firmly adherent to the chest wall. In such case the operation can be safely completed in one stage.

Now in this case everything is ready for the operation. We shall first introduce a needle to see if we can find pus. We cannot conveniently secure good posterior drainage here because the scapula is in the way. We shall therefore insert a needle in the axillary line in the fourth intercostal space. The needle has now been inserted for a distance of about 2 inches from the skin and 10 cc of thick mucoid slightly brownish pus is obtained. We shall proceed therefore with the operation.

We can do the rest of the operation under novocain (0.5 per cent) or with nitrous oxide and oxygen. If the patient is worried or apprehensive I think nitrous oxide and oxygen preferable. We shall use it here for that reason. We shall make an incision between the anterior and posterior axillary lines parallel to the fourth rib. We cut boldly through the muscle to the rib. The periosteum of the rib is now incised and it is pushed off the rib with a raspator. It is desirable not to have the raspator harp. If we separate the periosteum carefully from completely around the rib there will be no injury to the pleura or to the intercostal vessel which is located on the under surface of the rib but outside of the periosteum. Having separated the periosteum we now resect about 2 inches of the rib with bone shears. It is impossible to be sure in this case whether adhesions are present or not. We shall take no chances and accordingly we shall suture the lung to the parietal pleura with catgut. I do not like to leave the pus in this case for three days more waiting for the adhesion to become firm but yet I do not wish to take the risk of taking it from a permanent draining wound. I think we can compromise with reasonable safety by a partial abscess

now with a relatively small needle and postponing the permanent drainage. Even the aspiration ought to relieve the patient of a large amount of toxic material. We have now removed about 250 c.c. of thick odorless slightly reddish pus. The wound will be packed open with iodoform gauze and in about three days the abscess will be opened boldly and permanent drainage established. At the second stage it is seldom necessary to use any anesthetic at all. The lung itself including the visceral pleura is practically insensitive to pain. The parietal pleura which is sensitive usually loses its sensibility during the period of waiting.

(Three days later the patient was shown again.)

DR GRAHAM. The aspiration of the pus at the first stage operation in this case resulted in rather a marked temporary improvement in the general condition. The temperature went down in twenty-four hours from 103° to 100° F. and the pulse rate diminished accordingly. Last night however his temperature again reached 103° F. and the pulse 130. This fact probably indicates a reaccumulation of pus. Physical examination fails to indicate any dulness at the base so that probably no leakage occurred to produce an empyema. We shall proceed therefore to the evacuation of the abscess. We shall first locate the abscess again accurately with the needle and leaving that in as a guide we can introduce a cautery knife right down into the cavity. A cautery has some advantages over a knife in this procedure in that its use is followed by less hemorrhage and also perhaps in that the heat seals over the uninfected lung which is exposed in making the drainage tract. In this way the possibility of infection of healthy lung tissue is perhaps minimized. Having now found the abscess again with the needle and having introduced the cautery along the needle we find pus pouring out. In all about 250 c.c. of pus have run out. A finger is now introduced for gentle exploration. This must be done carefully because sometimes relatively large blood vessels run right across the abscess cavity which could be easily torn with the finger. If we should get serious hemorrhage from such an accident we should pack the cavity with gauze. We find that the cavity is apparently unilocular so we shall terminate the operation by

inserting a fairly large drainage tube into the abscess to provide adequate drainage. We shall not place any sutures in the wound. In the after treatment we shall not use irrigations because even if we did not drown the patient we might cause damage by spreading the fluid throughout the lung.

The importance of tonsillectomy as a causative factor in the production of lung abscess is constantly being recognized more and more. In this case however there had not been a previous tonsillectomy. The use of general anesthesia particularly of ether anesthesia in the operation of tonsillectomy seems especially dangerous in this respect probably because aspiration more readily occurs than if the patient is not unconscious. Usually if a lung abscess develops its symptoms begin to appear in a few days after the tonsillectomy. Lemon in a study of 81 consecutive cases of lung abscess at the Mayo Clinic found etiological factors as given below.

Pneumonia	31
Cold	19
Operative	
Tuberculosis (1)	7
Tuberculosis (1)	5
Appendicitis	2
Gastritis	1
Osteomyelitis	1
Etiology	1
Trauma	2
Unknown	12

We learn in a study of 100 cases of lung abscess that 21 had followed tonsillectomy. In our own at the Barnes Hospital only 3 out of 73 cases of pulmonary suppuration diagnosed respectively as lung abscess, gangrene and bronchitis seemed to have been due to a tonsillectomy done less than a year ago under general anesthesia. In the latter nine tonsillectomies (about 20,000) performed by Dr. Slud and his staff the results were as follows:

	L m	Ab	f th	L	g	C	d	M d	l sso	J	19 0	p	
1079	W	l	H	S pp		d	G	g	f th	L	g	St dy	f 100
C	J	Am	M d	A soc	1919	fc	p	1918					

and oxygen and the a lung abscess has been practically unknown

Concerning the bacteriology of lung abscess there is an increasing tendency to minimize the importance of the rôle played by the pneumococcus. Hartwell states that in 770 consecutive cases of pneumococcal lobar pneumonia admitted to the Rockefeller Hospital New York only 2 developed lung abscess and each of these showed other infecting organisms. He considers that the pneumococcus is not an important factor in the production of lung abscess but that the *Staphylococcus aureus* is often responsible. Opie and his co-workers in a study of the influenza pneumonia found that in cases of lung abscess the organisms which were the most frequently isolated from the lung were streptococci (hemolytic) and staphylococci.

As regards the treatment of lung abscess there are certain cases which demand surgical intervention and there are some other cases in which more conservative treatment seems justifiable. The decision in regard to this point depends largely upon whether or not adequate drainage through a bronchus has already been secured at the time the patient is seen. How adequate the drainage is must be determined chiefly by the general condition of the patient (amount of toxemia, pulse, temperature, leukocytes, etc.), the size of the abscess, the amount of pus in the sputum, and the progress of the case during a short period of watching. In cases such as the one presented here there was no question about the advisability of instituting surgical drainage because of the high grade toxemia, the increasing severity of the symptoms, the increase in size of the abscess, etc. Probably all large abscesses should be drained surgically. On the other hand it is surprising to see how much can be accomplished by non-surgical means in some cases of small abscesses in which there exists a communication with a bronchus. These non-surgical means consist chiefly of postural drainage and artificial pneumothorax. By postural drainage is meant coughing up the

Hartwell Abscesses of the Lung. Surg. 1906, p. 333.

Opie, F. L., Block, Small, and R. E. p. m. c. R. p. t. ry. D.

1911 p. 203. C. V. M. b. C. St. Lo.

pus while in the position which seems to give the best flow. Usually the best position is with the head and chest lower than the rest of the body. A position sometimes effective for the patient to lie across a chair and put his hand on the floor with the head and thorax on an incline. This procedure can be repeated two or more times in a day.

The increasing use of artificial pneumothorax has demonstrated the effectiveness in certain cases of compression obtained by the insufflation of air into the pleural cavity. Forlanini in 1910 reported a case in which an abscess had been present for six years. It was treated only by artificial pneumothorax and at the time of the report it was said to have been healed for three years. Goldberg and Biesenthal have collected 16 cases including 3 of their own which have been treated only by artificial pneumothorax. Of this number 15 per cent were improved and 12 per cent died. Tobiesen³, DeVerlizier and Loiseleur⁴ and Ritt have reported successful cases. On the other hand Wessler⁵ has reported 7 deaths following the use of artificial pneumothorax in cases of lung abscess both patients died suddenly after the last insufflation and a marked extension of the disease was found. It is perhaps too early to evaluate the effectiveness of this procedure in the treatment of lung abscess but it seems to me probable that it will be found to be a useful agent in a small percentage of cases. Careful judgment will be necessary in selecting those cases suitable for treatment by this method.

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 Artificial P. m. th. Am. R. T. be. 1919 p. 169
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 J. Am. M. d. A. soc. 1919 1. p. 191

Foreign bodies associated with lung abscesses should be removed. Chevalier Jackson¹ in his remarkable experience with 789 cases of foreign body in the air and food passages has repeatedly observed recovery in apparently undoubted lung



Fig. 590.—Eight days after removal of foreign body from a bronchus by means of the bronchocope.

abscess after the removal of a foreign body from a bronchus by means of the bronchocope.

Finally some old cases of lung abscesses associated with extensive fibrosis of the lung and with bronchiectasis will per-

Jackson, Chas. L. The Symptomatology and Diagnosis of Foreign Bodies in the Air and Food Passages. B. J. Urology, 1921, 1, p. 65. (F. G. Boddy, 1921, 1, p. 65.)

haps require a resection of the affected portion of the lung if they are to recover completely

Postoperative Note —Following the drainage of the abscess in this case the patient made a rapid recovery. The fever dropped quickly to normal and the leukocytes came down in six days



Fig 591 —T. High magnification of the lesion.

from 19,000 to 9,600. He was discharged half an hour after the first take of the operation. Prof. M. L. S. J. after the completion of the drainage. Dr. Kimball found that although the patient's blood did not get to the level of the red cells it showed a 2+ myelomonocytic reaction to them.

CLINIC OF DR WILLARD BARTLETT

MISSOURI BAPTIST SANITARIUM

FIVE GOITER PATIENTS

THE experience with thyroid affections in this clinic forces us to the conclusion that the newer surgical treatment of this subject should be characterized by differentiation in the operative procedure to be employed in a given instance. There was a time when goiter in general meant thyroidectomy with wound closure. As a result of the epoch marking work of Kocher, C. H. Mayo, Crile and Halsted, to say nothing of others who have written less, this is no longer true today. By selecting a type of operation which exactly fits the type of disease, we have done more than in any other way to decrease mortality and shorten morbidity in this field. This will be more readily understood when one contemplates the development of a step by step operative procedure which culminates in the removal of a large percentage of thyroid tissue. It may be illustrated by reference to a patient who had no less than seven gas anesthetics during the year in which she was intermittently under treatment.

July 1, 1921 right superior thyroid was ligated

July 6, 1921 left superior thyroid was ligated

September 2, 1921 skin and muscle flaps were cut, packs being left, exposing right lobe

September 29, 1921 right lobe was resected

October 1, 1921 skin wound was closed

May 18, 1922 left lobe was resected

May 20, 1922 skin wound was closed

This lady is now in excellent health, although each of those seven operative attacks seemed to be all she could endure at the time.

Each of these 5 patients illustrated different type of surgical treatment. The first was cut and by a special procedure the

We cannot pass on to a consideration of the 5 patients which will be presented without mentioning the accurate differential diagnosis without which no differentiation as to operative treatment is possible

L. B. Wilson and others who have followed in his footsteps since first he gave a sharply defined picture of the pathologic anatomy now divide goiters into (1) Toxic ophthalmic (2) toxic adenomata (3) non toxic or simple goiters of the adenomatous or colloid type and (4) the malignant ones which have no place in this demonstration today

It is to be regretted that the time at our disposal makes it impossible to say more about the fundamentally important matter of preoperative care than can be stated incidentally in a presentation of the illustrative cases

For various reasons to be detailed as each patient is presented for operation the indications have been classified in this clinic under five headings as follows

- 1 Ligation of superior thyroid vessels
- 2 Unilateral resection on the male subject
- 3 Unilateral resection on the female subject
- 4 Bilateral resection with wound left open
- 5 Bilateral resection with complete wound closure

CASE I

Case I illustrates the need of ligation. Mrs. M. is a housewife forty-two years of age. She complains of a goiter shortness of breath palpitation and nervousness. She has lost a great deal of weight probably between 30 and 40 pounds. She has had 9 children and one miscarriage. Has known that she has had a goiter for about thirty years. A cough developed following influenza but she thought it was a cold which disturbed her greatly and prevented sleep for one week. Thereupon she began to help the symptom just mentioned. The neck gradually increased in size as the nervousness increased. The breath and palpitation increased in frequency. She has lost strength coincident and proportionate to her loss in weight. There is a sense of pressure in the neck. She says that her feet

and ankles have been greatly swollen and she considers herself a wreck of her former splendid self

Physical—She has marked exophthalmos and weighs 122 pounds blood pressure 160/68 she has all the typical eye signs markedly diseased teeth and gums The tonsils are enormously large The thyroid is very much enlarged almost uniformly so on both sides There is a distinct median enlargement about the size of a hen's egg belonging to the right lobe which is comparable to a large lemon flattened and pushes the trachea well to the left the left lobe being somewhat the smaller of the two There are marked thrills and bruits over the superior thyroid areas the pulse is 135 and there is a pronounced tremor of lips and fingers The heart is dilated 4 cm to the right of the m s line and 11 cm to the left of it Her intramuscular p s p is 45 per cent the first hour and 15 per cent the second

The patient has rested for three weeks in bed here in the hospital meanwhile her metabolic rate which was plus 85.5 when she entered has gone down markedly at times and since she has vascular disease characterized by thrills and bruits in the thyroid area to say nothing of exophthalmos we know that we can still further greatly improve her condition and render her a better subject for partial thyroidectomy by ligating the superior thyroid vessels and thus interfering with the blood supply of the gland its nerve supply which governs secretion at the same time blocking some of the lymphatics which drain it

The patient has had two $\frac{1}{2}$ grain doses of heroin one hour apart and now thirty minutes after the second dose we find her sleeping soundly and unaware of our presence

Heroin is about twice as powerful as morphin and is preferred to that drug because it so rarely produces vomiting during the operation We never take a patient to the operating room if she is sick enough to need a ligation If the weather permits these little operations are all done on one of the widely exposed hospital porches because the patient's oxygen need is so high that it is impossible for her to breathe without struggling if her bed remains in the ordinary sick room which is crowded by assistants attendants and spectators You will note in this in

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the upper border of the thyroid and usually lies in one of the skin folds. The outer half or two third of this connecting scratch marks the line of incision (Fig. 592) which practically covers some portion of the superior thyroid vessels. In fact their thrill and pulsation can usually be felt directly under it before the operation is started.

The field is now infiltrated with per cent novocain which will give a complete analgesia for about five minutes. Of course no adrenalin is used since it would likely bring about an acute thyrototoxic condition. The usual incision is made down to the ribbon muscles and here we differ from many others by continuing to cross cut in the original plane the fibers of these little muscles as they present themselves. This greatly simplifies and one may almost say renders fool proof the matter of finding the vessel.

You will note that superficial bleeding is controlled almost wholly by retraction. The position of the hooks is changed as succeeding layers are opened up until a perfectly dry wound and an adequate exposure are guaranteed by these four small special instruments when the proper depth is reached. In this instance you will see that we have exposed the anterior branches of the artery and veins by catching them with a hemostat drawing them slightly forward superficial retraction being exerted meanwhile upward and backward exposing the bifurcation without difficulty then at a point just above it we encircle the entire group of enormous tortuous vessels also adjacent strands in which lie nerves and lymphatics with a full curved needle. This is armed with a rather fine strand of so called extra hard catgut which has been tanned to resist absorption in muscles for approximately sixty days. We now suture in a rather sketchy manner various muscle planes and finish with about three skin clip.

If during the procedure the gland has been torn cut or the polar tissue constricted a sharp reaction occurs presumably on account of the liberation of thyrototoxic matter into the tissue. Ever since experience first demonstrated the truth of this observation we have left a little drain of folded rubber in every

stance that a restraint sheet borrowed from our neuropathic ward is employed and thus an unexpected struggle which is possible under very light gas anesthesia is prevented. This is very important because more or less of our paraphernalia is at times scattered about over the patient when operating on a bed.

The tremendously important matter of the anesthetic now engages our attention. As a routine we employ gas oxygen with the apparatus set for 50 and 5 according to the Crile

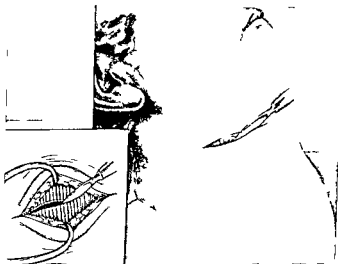


Fig. 592.—Illustration of the patient in the position of the limb, the incision, and the small corn set held in place by the fibrous material.

formula. Since the concentration of nitrous oxide is only a little more than half that employed safely in thousands of cases by the exodontists, you will realize how completely harmless the procedure is.

With the patient in a state of somnolence when he will take no notice of an needle scratch the median line marked along the anterior border of the sternomastoid then these two points connected up by an oblique scratch which follows approximately

a marked tremor of many muscle and thinks that he lost about 50 pounds during four weeks three months ago. He has had a small goiter most of his life it has not changed much in size during the progress of his symptoms and until quite recently no one suspected that the symptoms referred to either with irritability, pendancy and positive air hunger had anything to do with what he called the small lump in his throat.

Physical—He is emaciated pulse strange to say is only 84 blood pressure 150/100 n.p.n. 40 metabolic rate has receded from 38 plus to 14.2 plus in the last three weeks. The eyes present nothing abnormal teeth are black show much dental work and several are missing pharynx and mouth are foul tonsils are not visible. Pulsation in all the vessels of the neck is evident the veins being markedly dilated. There is a slight enlargement of the thyroid especially of the right lobe. There are no thrills or bruits the consistency of the gland is firm it being studded with hard spheric nodules averaging about the size of a large hazel nut the heart dulness is greatly increased both to the right and to the left there is a very wide apex beat the heart is irregular but no murmurs are heard. **Diagnosis** Toxic adenomatosis. **Recommendation** Resection in multiple stages.

This patient represents a class who carry adenomata in the thyroid all their lives and in middle or advanced adult life blow up with toxic symptoms. (They practically never show exophthalmos or thrill and bruits in the thyroid vessel although in one or two instances we have in this clinic observed a mixed type as we thought where limited hyperplasia was found after removal of an adenomatous lobe. However to keep the picture clear we shall do no more than mention this phase of the subject in passing.)

These toxic adenoma patients experience extreme cardiac damage and to all intents and purposes present the general toxic picture of the hyperplasia cases. The diagnosis in most instances easily made by the absence of thrills bruits and exophthalmos to say nothing of other less obvious distinctions.

The surgical treatment of toxic adenomatosis presents an evident difficulty in that we have no choice of operative pro-

wound where a ligation of the vessel has been accompanied by gland injury. In fact some of the smallest wounds have been left wide open where the thyroid has been considerably damaged the procedure having been justified by uniformly satisfactory results.

Our patients seem very much more comfortable since we no longer apply a dressing of any kind. The after care in its general aspects is a continuation of the preoperative treatment while the special wound treatment consists in the removal of the clips at the expiration of twenty-four hours to prevent scarring incident to their use if left in place too long.

Should swelling, redness and skin tenderness appear as they sometimes do at the expiration of thirty-six or forty-eight hours we then apply a hydroscopic pack of glycerin soaked gauze covered by gutta serena which never fails to give relief if left in place for about twelve hours.

After history—Five days later a second ligation was made on this patient and because the gland was so large especially on the right side seven days after the second ligation an injection of hot $\frac{1}{2}$ per cent novocain was made into the body of it. She continued to improve rapidly in all particulars left the hospital three days after the injection and so far as her present condition would indicate will be ready for the safe removal of thyroid tissue about three months after the final operation.

CASE II

Case II illustrates the need of unilateral resection (m l). Mr. L., thirty-three years of age, experienced quite another phase of the disease not so much from the clinical as from the pathologic anatomical standpoint hence the operative treatment followed in this instance bears no resemblance to that demonstrated upon our first patient. The diagnosis is thus indicated. There are no thrills, bruits or phthasms hence ligation would do no good and believed by C. H. Mayo to be decidedly harmful. The patient entered the hospital five weeks complaining of nervousness, palpitation and tachycardia. He has been sick one year, knows that his pulse has been rapid and

a marked tremor of many muscles and thinks that he lost about 50 pounds during four weeks three months ago. He has had a small goiter most of his life; it has not changed much in size during the progress of his symptoms and until quite recently no one suspected that the symptoms referred to together with irritability, despondency and positive air hunger had anything to do with what he called the small lump in his throat.

Physical—He is emaciated, pulse strange to say, only 84, blood pressure 150/70, n.p.n. 40, metabolic rate has receded from 38 plus to 14.2 plus in the last three weeks. The eyes present nothing abnormal, teeth are black, show much dental work and several are missing, pharynx and mouth are foul, tonsils are not visible. Pulsation in all the vessels of the neck is evident, the veins being markedly dilated. There is a slight enlargement of the thyroid, especially of the right lobe. There are no thrills or bruits, the consistency of the gland is firm, it being studded with hard, spheric nodules averaging about the size of a large hazel nut, the heart dulness is greatly increased both to the right and to the left, there is a very wide apex beat, the heart is irregular but no murmurs are heard. **Diagnosis** Toxic adenomatosis. **Recommendation** Resection in multiple stages.

This patient represents a class who carry adenomata in the thyroid all their lives and in middle or advanced adult life blow up with toxic symptoms. (They practically never show exophthalmos or thrill and bruits in the thyroid vessel, although in one or two instances we have in this clinic observed a mixed type as we thought where limited hyperplasia was found after removal of an adenomatous lobe. However, to keep the picture clear we shall do no more than mention this phase of the subject in passing.)

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The surgical treatment of toxic adenomatosis presents evident difficulty in that we have no choice of operative

cedures because the removal of thyroid tissue is the only recourse we have while the exophthalmic group may be stepped up to this trying ordeal by successive ligations of one to four vessels. The only quantitative determination on our part for the patient under consideration is this: how much thyroid are we going to remove? He is a bad risk so we shall obviously not attack both sides.



Fig. 593.—Thyroidectomy between the small scapular and the posterior axillary line.

The procedure employed in this clinic on a bad risk male subject who declares will accept an unsightly scar contemplates the simplest and most direct approach to the gland hence the evolution of a technic which differs very considerably from that generally employed in thyroidectomies of the past.

This man has had heretofore no sleep in his bed on a porch for the reasons just given in connection with the ligation case.

presented. He is under a light gas anesthesia the machine set at 50 and 5 also a faint needle scratch (Fig 593) is seen indicating the anterior border of the right sternomastoid muscle (Fig 594). We are now infiltrating the skin fat and fascial planes underlying this scratch with per cent novocain (no adrenalin). The patient's face has been turned far to the left

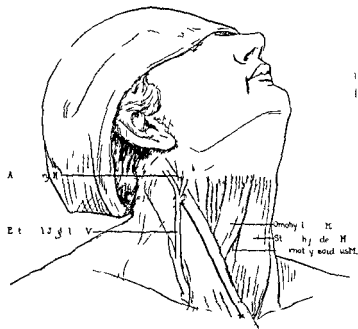


Fig 594—Th l to hp fth k t th t bo d fth
t nat d ppa t th t

in order to get a clear field then an incision down to the sternomastoid is made it is sharply retracted backward in its lower reaches (Fig 595) until the clavicle can be plainly felt. The opposing lip of the fascia wound is caught up and sharply retracted toward the larynx thus exposing the ribbon muscles which are infiltrated and divided longitudinally (Fig 596) down to the right thyroid lobe with a facility and absence of bleeding

cedures because the removal of thyroid tissue is the only recourse we have while the exophthalmic group may be stepped up to this trying ordeal by successive ligations of one to four vessels. The only quantitative determination on our part for the patient under consideration is this: how much thyroid are we going to remove? He is a bad risk so we shall obviously not attack both sides.

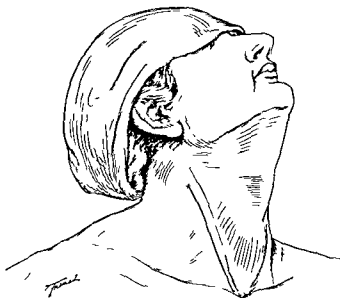


Fig 593—The patient between the small scapular incision and the posterior thoracic incision.

The procedure employed in this clinic on a bad risk male subject whose collar will cover an unsightly scar contemplates the simplest and most direct approach to one lobe hence the evolution of a technic which differs very considerably from that generally employed in thyroidectomies of the past.

This man has had his head and lies asleep in his bed on a porch for the reasons just given in connection with the ligation case.

presented. He is under a light gas anesthesia the machine set at 50 and 5 also a faint needle scratch (Fig 593) is seen indicating the anterior border of the right sternomastoid muscle (Fig 594). We are now infiltrating the skin fat and fascial planes underlying this scratch with $\frac{1}{2}$ per cent novocain (no adrenalin). The patient's face has been turned far to the left

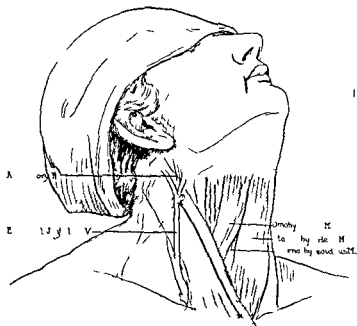


Fig 594—The l t h p f th k n t th t b o d f th
t m a t d p p t th t

in order to get a clear field then an incision down to the sternomastoid is made it is sharply retracted backward in its lower reaches (Fig 595) until the clavicle can be plainly felt. The opposing lip of the fascia wound is caught high up and sharply retracted toward the larynx thus exposing the ribbon muscles which are infiltrated and divided longitudinally (Fig 596) down to the right thyroid lobe with a facility and absence of bleeding.

which cannot but astonish one who uses the procedure for the first time. The gland capsule especially the upper pole and tracheal attachment is now pumped tightly full of $\frac{1}{2}$ per cent novocain which cause the lobe to *project itself partly out of the wound* as well as produces hemostasis and local anesthesia.

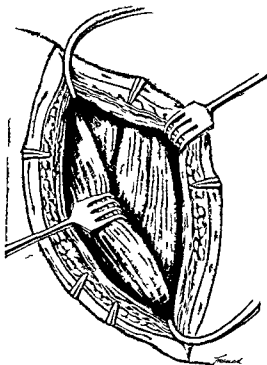


Fig. 59.—The position of the parathyroid gland in the neck.

The resection can be made by grasping the upper pole of the gland with the forceps and pulling it out of the wound. The method is simple and the results are satisfactory. The operator has been struck by the fact that the difficulty of a

resection are practically over once the control of it has been established

After the upper pole has been divided the capsule and immediately subjacent thyroid tissue is divided circumferential to

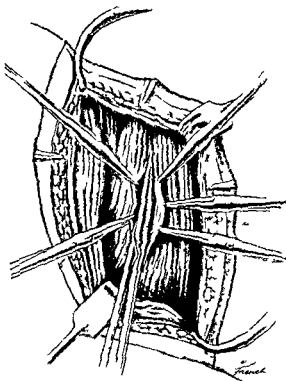


Fig 596—The upper pole has been divided the capsule and immediately subjacent thyroid tissue is divided circumferential to the tracheal attachment then a catgut suture is gradually drawn down tight in the furrow just established thereby strangulating the stump while the resection takes place just outside

the tracheal attachment then a catgut suture is gradually drawn down tight in the furrow just established thereby strangulating the stump while the resection takes place just outside

this mass ligature in an absolutely dry field. If the patient's condition warrants the operation may be terminated at this point with the few clamps left in position. It is however in exceptional cases only that this is done since it takes very little time to sew in place the few ligatures required to control the superior thyroids and the few bites on thyroid tissue made proximal to the mass ligature. Postoperative comfort is secured in this way although in an extreme case we do not hesitate to entail some discomfort if operative risk can be thereby considerably minimized. The tumor is seen to be about the size of a small lemon flattened. It is studded with small adenomatæ and cysts.

The wound is now flushed with alcohol to seal up tissue spaces against thyrotoxic juices which may have leaked out packed with rubber dam in order to insure complete drainage all exposed surfaces of every sort covered with rubber-dam to prevent glue from adhering to them and voluminous cotton packs wrapped in gauze applied clear around the back as well as to the front of the neck. It seems to have escaped general attention that drainage from the wound takes a downhill course around the sides and on to the back of the neck naturally enough soiling the pillow and bedding unless the last named surfaces are better protected than the front of the neck and upper chest which remain comparatively dry.

The after treatment of these patients is nothing more than a matter of keeping them quiet and getting enormous quantities of fluid into them. We frequently have to resort to intravenous massive dose for the first twenty-four hours and always employ normal saline hypodermically. The patient is kept up to the level of a few thousand cubic centimetres during this period unless the patient can drink and retain large quantities.

The care of the wound is a routine matter. At the end of the first twenty-four hours we shall remove the rubber pack and pour the cavity full of sterile glycerine which will cause rapid exosmosis. Then at the end of the second twenty-four hours the patient will be given a whiff of nitrous oxide and the skin brought together with clips. At the end of the third day

more hour these will be removed and at some later time serum is almost sure to break through. Sometimes there is enough local inflammatory reaction to necessitate a glycerin pack. An observer can scarcely tell at the end of a month by inspecting the scars the patient whose neck has been swollen up primarily from one whose wound remained open for two days.

The second lobe is usually removed two to five days after the first although in a few instances these patients have recovered strength so slowly that we have allowed them to go home and return weeks or months later for the removal of the second side.

After history.—Three days after the right side resection which has just been described an identical operation was done on the left with the removal of a second lobe about the size of a hen's egg. It did not show any such extensive adenomatous changes as were present on the first side.

Under the gas anesthesia necessitated by the second resection clips were applied to the skin on the first side then two days later the skin on the second side was closed with clips after which the patient made a rapid and satisfactory recovery. He had no more of the cardiac symptoms which had characterized his preoperative stay in the hospital and we hear that two months after his operation he has gained much in weight and has resumed to a very modified degree his occupation as a farmer.

CASE III

Case III illustrates the need of unilateral resection (female). Miss H., sixty-one years of age, housekeeper, enters the hospital complaining of goiter and nervousness. She has been nervous for several years and has been steadily growing worse. During the past two years she has been losing weight, claiming to have lost 40 pounds within the last six months. There has been a marked tremor of the hands for the past two or three months, the hands and feet have swollen during that time and in the same period there has been much palpitation. She feels exhausted all the time, has great difficulty in doing the slightest bit of housework, knows she is irritable and always fighting her self.

this mass ligature in an absolutely dry field. If the patient's condition warrants the operation may be terminated at this point with the few clamps left in position; however in exceptional cases only that this is done since it takes very little time to sew in place the few ligatures required to control the superior thyroids and the few bites on thyroid tissue made proximal to the mass ligature. Postoperative comfort is secured in this way although in an extreme case we do not hesitate to entail some discomfort if operative risk can be thereby considerably minimized. The tumor is seen to be about the size of a small lemon flattened. It is studded with small adenomata and cysts.

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The after treatment of these patients is in general rather a matter of keeping them quiet and getting enormous quantities of fluid into them. We frequently have to resort to the use of massive doses for the first twenty-four hours and all days employ normal saline hypodermoclysis. The patient gets the extent of a few thousand cubic centimeter during the period unless the patient can drink and retain the enormous quantities.

The care of the wound is a routine matter. At the end of the first twenty-four hours we shall remove the rubber pack and pour the cavity full of sterile glycerine which will cause rapid exfoliation. Then at the end of the second twenty-four hours the patient will bring a whiff of niter and add the kum brought to ether with clip. At the end of twenty-four

more hours these will be removed and at some later time serum is almost sure to break through. Sometimes there is enough local inflammatory reaction to necessitate a glycerin pack. An observer can scarcely tell at the end of a month by inspecting the scars the patient whose neck has been sewn up primarily from one whose wound remained open for two days.

The second lobe is usually removed two to five days after the first although in a few instances these patients have recovered strength so slowly that we have allowed them to go home and return weeks or months later for the removal of the second side.

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She has been told that her heart is at fault and given medicine for it but has never been told by a physician that she has a goiter although she herself is sensible of an enlargement in her neck which was not always there

Physical—Patient looks toxic pulse is 106 blood pressure 148/74 urine negative Metabolic rate 49.6 plus and 28.1 plus on two examinations P S P first hour 75 per cent al second hour 25 per cent V P N 34 She is well developed and nourished mental faculties and sensorium are clear nervousness present skin brown no general glandular enlargement Ears and nose negative pupils are medium react to light and accommodation no exophthalmos lips red with a marked tremor Has pyorrhea and several carious teeth some are missing Pharynx is granular and dirty Left tonsil considerably enlarged The thyroid is large and shows a general exophthalmic pulsation with very active pulsation in all veins of the neck The left lobe is the size of a large lemon flattened while the right is about half the size The tissue is rather soft and fairly smooth There are no thrill or bruits She has a marked coarse tremor of fingers and hand Examination of the chest shows lungs to be negative The heart hyperactive dilated both to the left and right with systolic murmur which is not transmitted Abdomen and extremities negative

Diagnosis—Toxic adenoma of the thyroid

Recommend—Resection in multiple stages

This patient has had her neck marked preparatory to operation the little scratch which you see having been located just along the line of a chain of beads placed where she while facing a mirror in the electropuncture electrode wear them (Fig 597) The marking is done with pen and ink originally then after this has dried but before perspiration or perspiration and water have removed it a light scratch is made along the line thus indicated The maneuver not only gives the patient confidence in regard for cosmetic considerations but also its necessity is easily scar being accurately hidden in the only favorable manner in the period in which it is sure to be noticed Later sitting in white noncoloring of any kind is indicated

This lady is under the influence of heroin and lies asleep before you on a porch for the reasons given in connection with Case I. She is under a light 50 and 5 gas anesthesia and will immediately be infiltrated along the line of the skin incision and subcutaneously over the anterior border of the sternomastoid muscle with 1 per cent novocain (no adrenalin) which will give us as long an analgesia as needed because we are not going to use any sutures there is no disadvantage in the super

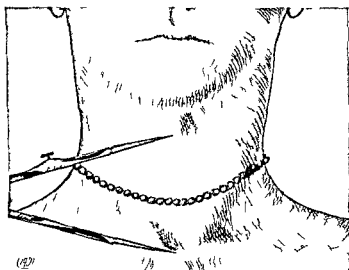


Fig 59 — The head is held in the position shown. The patient will be made comfortable.

facial tissues remaining sensation before the operation is completed.

You will observe that the infiltration is a very much simpler procedure here than that commonly employed in partial resection. The reason for this becomes apparent as we make a short incision through the skin only then instead of elevating two large skin flaps make merely a tangential subcutaneous stab (Fig 598) through the infiltrated area in front of the sternomastoid and with an automatic retractor (Fig 599) trans

form the cross incision into an oblique one by taking advantage of the well known fact that the skin of the neck slides readily in any direction over the tissues which lie beneath it. Very few

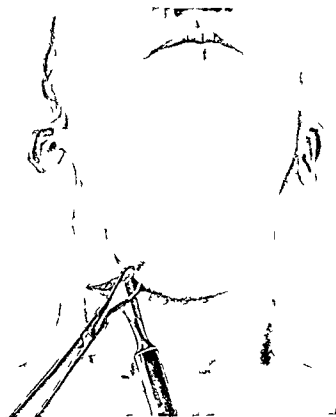


Fig. 598.—The small diamond-shaped pedicle, the dorsal border of which is the posterior border of the trachea, is the only one which is not necessary.

blood vessels are encountered during this procedure and by exposing the anterior border of the trachea the trachea is gained all the room that is needed.

By this time the observer will have become impressed by the fact that we are about to give this female patient the benefit of that same simple and direct approach to a thyroid lobe which was employed on the male patient whom we just left without in any sense sacrificing the cosmetic value of the collar skin incision which was so long ago proposed by Kocher. A woman who takes any pride in her appearance will not and should not tolerate any other skin incision on the front of the neck than one which can be covered by a chain of beads or in some instances laid directly in a transverse skin fold. Her clothing will not minimize the disfigurement of an oblique horizontal horn-shaped or other skin scar in this region.

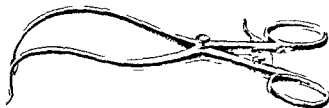


Fig. 599.—Small retracting forceps for use in the thyroid operation.

The retraction of the sternomastoid division of the ribbon muscles, injection of novocain into the goiter, treatment of the upper pole division of the capsule, the use of mass ligature, the suture ligation, of bleeding points, flooding with alcohol, the rubber pack, wound dressing, the removal of the pack at the end of twenty-four hours, and flushing with sterile glycerin are all identical with the procedure described in connection with the male subject No. 2 in this series. The tumor appears to be about the size of an average lemon, flattened and presents numerous adenoidata of various sizes.

The skin wound is left open until the second side has been

removed. This is never done before the expiration of two days and in some instances we have to wait three four or even five days before the patient has so far recovered as to render it free from danger.

The second step is in most particulars a replica of the first however there are a few special considerations which should be mentioned at this time. Infiltration and the skin flap is not particularly applicable to the surface tissue of a neck which is open hence the amount of heroin and gas employed are relatively larger than for the first side. The subcutaneous fat is infiltrated along the anterior margin of the second sternomastoid muscle the transverse skin lifting stab made as usual and the cross incision transformed into an oblique one as on the first side. But the next step consists in grasping firmly with a tenaculum the mesial lip of the original oblique wound in cervical fascia and drawing it well toward the first side. It is by this means only that the anterior border of the second sternomastoid can be nicely liberated and retracted.

After this is done the second resection proceeds in exactly the same manner as that indicated for the first side. Two days after the second side has been removed a few whiffs of gas are given and clips are readily applied. We never leave a drain since any serum which has to come through will find its way out without any help on our part. Very frequently a large glycerin pack has to be used on the second or third day for a few hours but no other dressing is applied to the wound after the clips are placed in position.

After history—Five days after the first resection on the second was done then three days later the skin flaps were approximated the patient went on to an interrupted recovery and has had no more of the serious heart attack which characterized the early history.

CASE IV

Case IV illustrated the need of bilateral resection though unduly left open. The technical division of the subject occurred to us as being a thoroughly logical one following many unfortunate experiences with cutomized incomplete bilateral dissection.

the considerable cavity left after the removal of a very large goiter. The patients whom we propose to treat in this radical manner are well enough to stand the bilateral resection with closure but have a much less complicated postoperative history if the wound is left wide open instead and packed with rubber during the twenty four to forty eight hours in which slight postoperative oozing takes place meanwhile the surrounding tissues of the neck are contracting and obliterating potential cavities.

Miss M. fifty years of age housewife on farm comes in complaining of a goiter and choking sensations. She is nervous short of breath has had some swelling of the feet and ankles. Her appetite is poor has abdominal colic at times urination is somewhat frequent. She noticed a goiter ten or twelve years ago. It was small at that time but has gradually and steadily grown to its present proportions. However her general health was good up to three months ago since which time she has had frequent sore throats with plugging of the nose and headaches. Recently there has been shortness of breath palpitation but not much trouble in swallowing. She has a marked feeling of pressure in the neck and is afraid that as her goiter grows it will choke her to death.

Physical—Her appearance is that of a well nourished and healthy person. The pulse is 108. Heart and lungs are negative as is the urine. Blood pressure is 154/102. Hemoglobin 90 per cent. Metabolic rate normal. N P V 41 P S P intra muscular first hour 50 per cent second hour 5 per cent. Mental state and sensorium normal. Skin negative no general glandular enlargement nose and ears negative pupils small equal and react to light. No specific eye signs lips light red several teeth missing some crowns and bridge work. Gums normal right tonsil large.

The thyroid is greatly enlarged the right lobe pushing the trachea very far to the left extends up to the angle of the jaw and down under the right clavicle if dullness is to be taken as an indication it is the size of a small coconut firm and nodular. The left lobe is the size of a small lemon with dullness over the

left clavicle as well it is also firm and nodular. There are no thrill or bruits but marked fine tremor in the hands and fingers.

Diagnosis—Adenomatosis of the thyroid.

Recommend—Bilateral resection in one stage.

Of our first four thyroid patients this is the only one whose nervous system is stable enough to permit us to bring her to the operating room without undue psychologic shock. It is somewhat more convenient to work here; the light is better and we can secure a better position in the operating table than on the bed; hence we favor ourselves instead of the patient although we would not do this if she exhibited any special need.

She has had a strain of her arm which renders her somewhat indifferent to her surroundings as well as to a rather massive infiltration which is now being administered. The solution used is a 1 per cent novocain still without adrenalin for the reason that we are not going to sew her up and she will not need a superficial anesthetic after the five minute period has elapsed. We do not use it because every adenomatous patient has although it may not be actually thyrotoxic and of course we do not desire to run any risk of stirring up trouble.

This patient will probably require no gas at all since it is superfluous for one who is complacent provided of course that the local anesthetic be adequately and properly made. The superficial infiltration is done now because except along the line of incision and in the midline subcutaneous fat between hyoid and sternum since we no longer intend to flip. You will notice that the lady's neck has been marked just as was done with Case III. Her head is then bent back enough to give a perfect exposure then an incision through the skin only is made its length (Fig. 600) having been determined by the distance between the hyoid and sternum because we are going to make a midline ribbed muscle split and do not need more room in the skin wound than we are able to get in the depths.

After the skin incision we make tangential subcutaneous stab wounds which expose the midline of the neck both upward and downward and immediately by the use of two retractors (Fig. 599) transform the collar into a pen gnet hat

appears to be a vertical defect then divide platysma and cervical fascia between the ribbon muscles in the exact midline after infiltrating it thus exposing the thyroid. Under adequate retraction to both sides the base of the lobes and upper poles are pumped full of novocain then the operative attack is made beginning as Crile does between the isthmus and trachea the plane being divided in both direction toward the upper poles

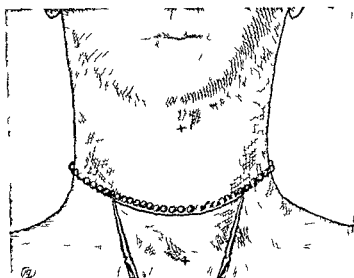


Fig 600—The length of the neck is divided by the plane of the incision. The upper poles are isolated first. The right side is divided sharply drawn up toward the ceiling and as the capsule is cut circumferentially well back toward the tracheal attachment the very large right lobe is with no effort at all withdrawn from its bed in the neck through a smaller opening in the muscle planes than one would consider adequate for any other method of delivering it.

The right being the larger side its upper pole is isolated first divided sharply drawn up toward the ceiling and as the capsule is cut circumferentially well back toward the tracheal attachment the very large right lobe is with no effort at all withdrawn from its bed in the neck through a smaller opening in the muscle planes than one would consider adequate for any other method of delivering it.

After the stump has been divided in the transverse plane the

left clavicle as well it is also firm and nodular. There are no thrills or bruits but marked fine tremor in the hands and fingers.

Diagnosis —Adenomatosis of the thyroid.

Recommend —Bilateral resection in one stage.

Of our first four thyroid patients this is the only one whose nervous system is stable enough to permit us to bring her to the operating room without undue psychic shock. It is somewhat more convenient to work here, the light is better and we can secure a better position on the operating table than on the bed; hence we favor our selves instead of the patient although we would not do this if she exhibited any special need.

She has had — in of heroin which renders her somewhat indifferent to her surroundings as well as to a rather massive infiltration which is now being administered. The solution used is — per cent novocain still without adrenalin for the reason that we are not going to sew her up and shall not need a superficial analgesia after the five minute period has elapsed. We also do not use it because every adenoma is potentially although it may not be actually thyrotoxic and of course we do not desire to run any risk of stirring up trouble.

This patient will probably require no general anesthesia since it is superfluous for one who is completely provided for, that the local anesthetic be adequately and properly made. The superficial infiltration is done now — except along the line of incision and in the midline subcutaneous fat between hyoid and sternum incision line raise up the flaps. You will notice that the lady's neck has been marked just as was done with Case III. Her head thrown back enough to give a perfect exposure then an incision through the skin only is made its length (Fig 600) having been determined by the distance between the hyoid and sternum because we are going to make a midline ribbon muscle split and do not need to remove in the skin wound then we are able to get in the depths.

After the skin incision we make a subcutaneous stab which exposes the midline of the neck both upward and downward and immediately by the use of two automatic retractors (Fig 599) transform the collar like piece into what

appears to be a vertical defect then divide platysma and cervical fascia between the ribbon muscles in the exact midline after infiltrating it thus exposing the thyroid. Under adequate retraction to both sides the base of the lobes and upper poles are pumped full of novocain then the operative attack is made beginning as Crile does between the isthmus and trachea this plane being divided in both directions toward the upper poles.

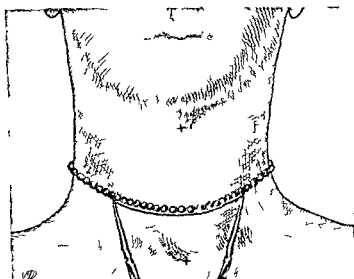


Fig 600—Th l gth fth k wh m d bbo m scl plt
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The right being the larger side its upper pole is isolated first divided sharply drawn up toward the ceiling and as the capsule is cut circumferentially well back toward the tracheal attachment the very large right lobe is with no effort at all withdrawn from its bed in the neck through a smaller opening in the muscle planes than one would consider adequate for any other method of delivering it.

After the stump has been divided in the transverse plane the

anterior surface of the trachea is exposed the first lobe and isthmus retracted forcibly to the completed side and in this way deliverance of the second lobe considerably facilitated. The maneuvers just demonstrated are repeated on the second side liberating the thyroid in one block the right lobe seen to be the size of a small coconut the left that of a lemon both studded with adenomata. Dozens of clamped bleeding points are controlled with running suture ligatures the entire defect packed with soft rubber and a voluminous cotton gauze dressing applied.

A large amount of bloody fluid always escapes from a wound treated in this manner hence the rubber is not removed until the end of the twenty four or thirty six hours during which they continue. The obliteration of cavities takes place during the twenty four hours following removal of rubber at the expiration of which time a catgut suture or two is placed in the midribbed muscle wound edges and the skin accurately and completely closed with clips.

The remote after treatment following removal of a large goiter has for its leading motif the administration of iodine in quantities sufficient to render the proper function of the small remaining portion of thyroid tissue (about one tenth of the normal) so easy that it will not hypertrophy and lead to what the patient naturally views as a recurrence.

After history—The day following the operation this patient sat up in a chair at the end of forty eight hours began to eat a little gas closed the wound and she left the hospital four days after the operation seemingly none the worse for the rather trying ordeal through which she had passed. Her health remains good.

CASE V

Case V illustrates the need for bilateral resection with complete wound closure. Mrs. K. thirty five years of age housewife comes to the hospital complaining of having been nervous which in had palpitation of the heart and frequent fainting. She presents a very interesting history of symptoms and signs frequently seen because of the numerous misconceptions re-

alent concernin^g goiter not only among the laity but among some elements of our profession as well

This lady's present illness commenced two months ago after being told by a number of persons that she had a goiter. A physician prescribed iodid of potassium the dose being pushed up as high as 90 drops of the saturated solution per day. In addition to this on the advice of a druggist she took thyroid tablets. After a month of such mistreatment she experienced the logical consequence of giving iodine and thyroid to a person of thirty-five with an adenoma of the thyroid gland viz she who had been a perfectly healthy woman began to grow very nervous her heart commenced to thump her facial expression became drawn she lost strength but not weight then after she fell into the hands of a physician conversant with the diseases of the thyroid gland medication was withdrawn and she became a normal woman again.

Six years ago she suffered with what was called a nervous breakdown lasting six months the cause being unknown. This is significant in the history of an adenoma patient who is known to have been rendered acutely hypertoxic by the administration of iodine. It indicates that the so called nervous breakdown may quite well have been a thyrotoxic paroxysm. There is now a marked sense of pressure in the neck and considerable difficulty in breathing at times when in the lying posture.

Physical—Pulse is 88 heart and lungs normal blood pressure 136/72 hemoglobin 80 urine negative Pupils small react to light no specific (thyroid) eye signs the gums show retraction she has many crowns fillings and bridges and her tonsils are large. The thyroid is quite markedly enlarged the right side being about the size of a small lemon pushing the trachea to the left while the left lobe approximates a hen's egg in size. There are no thrills bruits or subclavicular dulness.

Diagnosis—Adenoma of the thyroid (quiescent period)

Recommend—Bilateral resection with complete closure if feasible

This lady presents a clear indication for what might be termed the ideal thyroidectomy viz an operation in which the desired

amount of gland (something like nine tenths) is removed at one sitting with complete closure of the wound. No form of open drainage is required either to prevent absorption of thyrototoxic material or to permit compensatory shrinkage of unusually large dead spaces.

She has been brought to the operating room for the reasons stated and her neck been marked according to the method described in the consideration of the preceding patient. The choice of an anesthetic presents no difficulty here since there are no special indications of any kind. Ether may be safely used by those accustomed to *goiter surgery under its influence* still my personal preference is never to employ it in doing any operation about the thyroid. The combination of heroin, novocain and nitrous oxide give such unqualifiedly good results that *I see no need in departing from its use here just because there is no danger in doing so.* In fact the patient is perfectly composed and the operation will be carried out as far as we can now foresee under infiltration anesthesia alone. Our 1 per cent novocain solution now contains for the first time *one drop of adrenalin to the ounce* whereas we have for definite reasons not used it on any of the other 4 patients presented. In this case a full skin anesthetic at the expiration of a half hour or so will be required because we intend to make a complete closure. *There is no need of using 2, 3 or 4 or even 5 drops to the ounce and no likelihood of deterioration thereby since 1 drop is sufficient to produce the desired effect for about one hour.*

As to the technic of the operation it differs not at all from that demonstrated on Case IV. As far as concern the position of the head, the skin flaps, the indrawing of the scalp, the distending of the goiter with novocain, the surgical attack upon the tumor, the removal of both sides in one block or the uterine ligation of the many clamped points but it is just here however that we depart from a method which has characterized the three resections which have preceded this one. We will produce no rubber drainage, no rubber pack but all the special structures of the neck tend to point the small caustic which have resulted from the removal of one block of the symmetrical lobe.

colloid goiter each lobe of which you note is about the size of an ordinary hen's egg flattened. (It is becoming routine in our clinic to pack widely open every thyroid wound which needs drainage and to completely suture those which do not require it. The rubber pack has therefore entirely displaced small tubes or other drains where we have foreseen the necessity of drainage at all.)

We introduce two or three interrupted stitches and close the midribbed muscle split with them. There is no separate suture of the platysma because it has not been divided in the line of the skin incision hence we are saved considerable time which would otherwise be spent in its separate closure and in ligation of veins which lie beneath it and are almost invariably injured when it is elevated with the skin flaps.

We next apply a very few skin clips and again save time over suturing. A well placed clip will close a small vessel in the subcutaneous fat and more time is gained in the control of these small annoying points. We do not care to close hermetically these skin wounds with clips placed too close together because a certain amount of blood and serum should always escape between them into the dressing leaving the superficial structures of the neck flat a thing which might not otherwise be the case. It will thus be seen that a certain care for little details has resulted in a very much more rapid and less complicated closure than that which most of us have been accustomed to employ.

The dressing of the wound presents nothing which has not already been described. The after treatment (general features) consists in allowing the patient to get up the next day to walk about to be given everything she can swallow the second day and to go home on the third or fourth according to the amount of nourishment taken and strength developed. We learned much about the after treatment of similar colloid goiters from a patient desiring to evade financial responsibilities who got out of bed put on his clothes and ran away from the hospital about dusk of the evening which succeeded his operation. I have never seen him since although his wife reassured us a few days later by telephoning that he was all right and asking how to get the

skin clips off. Another instance in point is that of a man seventy-eight years of age whose habits of life we feared to interrupt so after the removal of an enormous thyroid in the morning he was immediately placed in a wheel chair had his lunch on an open porch sat there quietly most of the afternoon walked about the next morning and was in fact invalided no more during his hospital postoperative stay than had been the case during the week he had been with us for preoperative preparation.

Not all the completely closed necks heal without the escape of a little serum at some time or another. There is however practically never any necessity of putting in a forcep probe or drain it usually being considered better in such instances to allow of spontaneous escape which invariably ceases as soon as all catgut in the wound has been absorbed.

After his story — This patient got up the day after the operation went home on the third day appeared in our up town office building at the end of one week after the operation and proved to be one of those who did not drain at all.

CLINIC OF DR. NATHANIEL ALLISON

BARNES HOSPITAL

OSTEOCHONDROMA OF THE SCAPULA

THIS patient comes to the hospital for the relief of an enormous swelling above his right shoulder which was first noticed six years ago. He is a colored laborer of forty seven years. He sustained an injury to his right shoulder while carrying a load of bricks. A brick fell 10 feet and struck his shoulder. Four months later a swelling was noticed which has gradually increased to its present size. His main disability has been due to the increasing size of the tumor which has limited the use of his arm. More recently there has been pain, numbness and muscle weakness in the right arm and forearm. There has been no loss of body weight, no fever or other constitutional symptoms.

DR. ALLISON (to Student) Will you please examine this patient and describe the characteristics of this tumor as regards the structures involved and its nature?

STUDENT The tumor is located in the posterior region of the right shoulder. It extends downward and forward into the axilla and can be felt anteriorly above the clavicle. The right humerus moves independently of the tumor mass and palpation shows the humerus to be of normal contour. The tumor mass is hard and nodular. It moves with the shoulder girdle. The skin surface over the tumor shows no change and is not adherent to the tumor. The tumor is not tender.

DR. ALLISON From this examination what structure do you believe to be the seat of this tumor?

STUDENT Since the humerus is not involved we must consider the scapula, the clavicle and the axillary lymph nodes.

From the Department of Surgery, Washington University School of Medicine



2



Fig 601—O t h d m f h p l b t ne t



DR ALLISON What characteristic of this tumor mass make it unlikely that it arises from the lymph nodes?

STUDENT The long duration the absence of constitutional disturbance are against this being a disease of the lymph nodes

DR ALLISON Yes and the hardness of this tumor is such that it could hardly be composed of any other tissue than bone

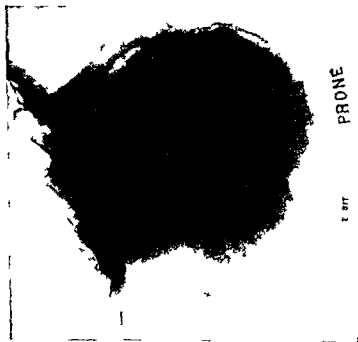


Fig 602 — R y p h t g p h f t m b e f p e t

or cartilage It seems that we have here a bony or cartilaginous tumor arising from the clavicle or scapula The x ray photograph shows the clavicle to be normal The scapula is not visible the tumor mass casts a dense shadow the details of which are suggestive of osteochondroma or osteosarcoma Will you please differentiate the two possible diagnoses of this condition

STUDENT Again the osteosarcoma are the following points
 1 Long duration of the tumor 2 No loss of body weight
 3 Absence of pulmonary involvement in x ray photographs of chest

In favor of osteosarcoma are the following points 1 The apparent complete destruction of the scapula as seen in the x ray photo-



Fig 603 — Ray photograph of the right shoulder and upper arm region

graph 2 The detailed study of the tumor in the x ray photograph 3 Osteosarcoma of the scapula more frequent than benign tumor of the scapula

DR ALLISON It is impossible to make a positive diagnosis of this condition without explanation. I am inclined to believe

that we have here a benign tumor arising from the body of the scapula. It is not a bone cyst; this is excluded by the x-ray photograph. It may be a giant cell sarcoma, an osteomyxoma, or an osteochondroma. I am inclined to believe it to be an osteochondroma because of the slow growth, its hardness, and because of the lack of signs of malignancy.



Fig. 604.—Photograph of specimen.

We will now explore the tumor and try to remove it. We are approaching this operation with the idea uppermost that amputation shall not be done except as a life-saving measure to control hemorrhage. In case the tumor is malignant, amputation will offer no greater hope of cure than simple removal of the tumor. In other words, if the tumor has metastasized, then at once the tumor has passed on into tissues beyond the reach of operation done at the tumor site.

STUDENT Against osteosarcoma are the following points
 1 Long duration of the tumor 2 No loss of body weight
 3 Absence of pulmonary involvement in x ray photographs of chest

In favor of osteosarcoma are the following points 1 The apparent complete destruction of the scapula as seen in the x ray photo-



Fig 603 — Ray photograph of the left scapula showing complete destruction of the bone.

graph 2 The detailed study of the tumor in the x ray photograph 3 Osteosarcoma of the scapula is more frequent than benign tumor of the scapula

DR ALLISON It is impossible to make a positive diagnosis of this condition without exploratory operation. I am inclined to believe

outer end at the posterior aspect of the shoulder joint. A second incision 8 inches in length was made at right angles to the first incision running down the posterior axillary line. The skin and the subcutaneous tissues were reflected revealing the tumor mass which had a glistening surface studded with many pearl like bodies having the appearance of sago. Without great difficulty the hand was passed round the tumor mass which projected posteriorly and an isthmus was discovered in the axillary space which connected the large posterior lobe with the anterior lobe of the tumor. The glenoid was identified and the neck of the scapula isolated from the tumor mass. The body of the scapula was deeply embedded in the tumor. An osteotomy was performed across the neck of the scapula and the posterior lobe of the tumor was removed by dividing the isthmus. By pushing the shoulder forward the anterior lobe of the tumor was now isolated and shelled out of its bed. In order to remove the upper anterior portion it was necessary to fracture the scapula 2 inches from its outer extremity. The entire tumor mass was now removed and the wound was closed with interrupted silk sutures for the deep layers and continuous silk suture for the skin. The shoulder girdle was put up in the approved position for treatment of fracture of the clavicle. The patient had lost very little blood and his condition was excellent. Time of operation forty five minutes.

Examination of the tumor showed it to be an osteochondroma. The tumor weighed about 10 pound.

Gross Pathology—Specimen consists of very large tumor mass measuring about 25 by 25 by 20 cm. The tumor seems to have been encapsulated. It is lobulated. The consistency is that of cartilage. The cartilages of the lobules have a semitranslucent appearance. The base of bone which was part of the scapula. On cross section tumor cuts with a gritty sensation down to the bone. Running in a sort of a leaf like fashion are little thin layers of calcified material about which is a material which looks like cartilage.

For microscopic examination sections were taken.

Microscopic Pathology—Sections show cartilage cells plus

What preparation is advisable before performing an operation of this character in order to safeguard the life of the patient?

STUDENT The patient's blood should be grouped and a donor should be at hand to supply the necessary blood for transfusion.

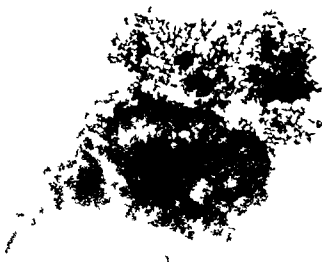


Fig. 60 — Ray photograph of the specimen.

DR. ALLISON (to first assistant) How should the preparation be made?

FIRST ASSISTANT It has and the following advice.

DR. ALLISON Start the anesthetic.

Description of Operation — An incision is made in the center of the tumor mass 12 inches in length, following the line of incision being approximately the thickness of the pulp of the

OF DR. M. G. SEELIG

THE JEWISH HOSPITAL

AND INTRATHORACIC GOITER

This morning is one of the type that forces you will note as he lies on the table that he is dead. His weight is 88 pound. His normal weight was 140 pounds. For fifteen years he has had almost constant gastro-intestinal distress. It is either as a chronic painful indigestion or as acute attacks of abdominal colic with moderate nausea and vomiting, slight icterus and fever. In other words his history is of a chronic disease. He has been under the care of several physicians but has steadfastly refused to submit to any operation. He has lost weight and the history of indigestion suggests the suspicion of a malignant growth. At the first time at midnight five days ago he had an attack characterized by an elevation of temperature to 102° and a pulse rate of 140 and an exquisitely tender large lemon in the gall bladder region over the right rectus muscle. He had been in bed for twenty-eight hours and there were so many tenderness of the gall bladder that I thought it was a rupture in the morning. After arrival at the hospital the temperature subsided, the mass in the abdomen diminished in size and the rectus muscle became firm. This sudden improvement suggests the possibility of a rupture of a cystic structure. The patient is now in the hospital and is doing well.

characteristic cartilage matrix. In certain areas there is a deposition of bone cells with their calcium salts. The matrix stains a homogeneous pink. The cartilage cells are rather atypical in size and shape.

Subsequent History—Patient has made an uneventful recovery. At the present time he is back at work and has only slight disability in using his arm.

CLINIC OF DR. M. G. SEELIG

THE JEWISH HOSPITAL

CHOLELITHIASIS AND INTRATHORACIC GOITER

THE first patient this morning is one of the type that forces the surgeon's hands. You will note as he lies on the table that he is markedly emaciated. His weight is 88 pound. His normal weight fifteen years ago was 140 pounds. For fifteen years he has been the subject of almost constant gastro-intestinal discomfort expressing itself either as a chronic painful indigestion or as sharply threatening acute attacks of abdominal colic with right shoulder pain, acute nausea and vomiting, slight icterus and a palpable gall bladder. In other words his history is clearly that of biliary disease. He has been under the care of an astute internist but has steadfastly refused to submit to operation. The striking loss of weight and the history of indigestion and colic warrant the suspicion of a malignant growth.

I saw this patient for the first time at midnight five days ago in one of his acute attacks characterized by an elevation of temperature (102° F.), a pulse rate of 140 and an exquisitely tender mass the size of a large lemon in the gall bladder region protected by a rigid upper right rectus muscle. He had been in this acute attack for forty-eight hours and there were so many reasons to fear impending gangrene of the gall bladder that I sent him to the hospital six o'clock in the morning. After arrival his pain rapidly abated, his temperature subsided, the mass in the gall bladder region slowly diminished in size and the rectus rigidity disappeared. It is clear that this sudden improvement was most probably due to the dislodgment of a biliary obstruction that had caused an acute distention of the gall bladder.

Permit me to digress here for a moment to say a few words on the significance of a palpable mass in the gall bladder region in acute gall bladder disease. I have repeatedly made a pre-

operative note to the effect that a large gall bladder was palpable only to find on opening the abdomen either that the gall bladder was small or that though large and hydropic it was so tucked under the lobe of the liver that I could not possibly have palpated it through the unopened abdominal wall. Such an error is due either to misinterpreting the rigid upper right rectus muscle as an intra abdominal mass or to mistaking an acutely swollen right lobe of the liver for a distended gall bladder. Graham has shown recently that acute cholecystitis is practically always accompanied by acute hepatitis. If the hepatitis is sufficiently pronounced the swollen liver can scarcely be differentiated from a distended gall bladder if we rely on preoperative palpation alone. In this particular patient the mass was so similar to the form of a distended gall bladder that I scarcely hesitate in making the diagnosis of either hydrops or empyema of the gall bladder due to an impacted stone. The impaction has evidently been relieved spontaneously. We shall try to protect the patient against subsequent attacks by removing the obstructing stone.

The physical examination of the patient reveals another set of symptoms that are of intersting and at the same time of grave significance. There is marked dulness over the manubrium sterni and upper midthorax extending to the right and left over a semicircular area (about 4 inches in diameter). Fluoroscopic and roentgenographic study disclose a mass that has none of the characteristics of an aneurysm of the aorta. We are inclined to think that we are dealing with a dermoid of the mediastinum. The patient is indubitably nervous and has a persistently high pulse even after the subsidence of fever so it may be that the mass is a goiter and that his high pulse rate and nervousness are symptoms of a toxic intrathoracic goiter. This much is certain. We should not have decided to perform a grave abdominal operation upon this patient except for the relief of what we can decide to be life threatening intraabdominal lesions. We believe we are dealing with a neglected and intermittently obstructed gall bladder with probably early cholangitis complicated by a dermoid of the mediastinum. An

intrathoracic toxic goiter We cannot exclude malignant disease of the biliary tract

The incision that I make extends from the xiphoid downward over the middle of the right rectus muscle to about 1 inch above the level of the umbilicus I displace the rectus muscle outward after incising its sheath and then open the peritoneal cavity

You will note first that the gall bladder is not visible With my hand in the abdomen I cannot feel the gall bladder Inserting my index finger in the foramen of Winslow I can palpate a mass of stones in the common duct and trace them up into the cystic I feel nothing suggestive of carcinoma of the pancreas liver or papilla of Vater

I now place my protective packings and you can now see the gall bladder this small structure the size of a little finger thickened and containing a few stones It could not possibly have been the site of a large hydrops or empyema The mass we felt before operation was either swollen liver or rigid upper right rectus or a combination of both

The anesthetist reports a mounting pulse so I shall quickly incise the common duct You see these small stones crowding out through the incision in the duct With my curet I remove about 40 stones I explore the right and left hepatic ducts and find nothing This large probe readily passes the papilla of Vater without encountering any obstruction and I can palpate the bulbous end of the probe in the duodenum

I next isolate the cystic duct and cystic artery I tie the artery with catgut and divide it clamp the cystic duct and divide it and then by sharp dissection with the aid of traction on the cystic stump I remove this shriveled gall bladder

I shall place this small catheter through the cystic duct stump into the common duct and completely close the incision in the common duct But you see I cannot force the catheter through the cystic stump A small probe clears up the difficulty The probe runs down the cystic for about $1\frac{1}{2}$ inches and then enters the common duct just above the duodenum This is known as papallem of the ducts I am obliged therefore to place my catheter directly in the common duct suture it in place

operative note to the effect that a large gall bladder was palpable only to find on opening the abdomen either that the gall bladder was small or that though large and hydropic it was so tucked under the lobe of the liver that I could not possibly have palpated it through the unopened abdominal wall. Such an error is due either to misinterpretation the rigid upper right rectus muscle as an intra abdominal mass or to mistaking an acutely swollen right lobe of the liver for a distended gall bladder. Graham has shown recently that acute cholecystitis is practically always accompanied by acute hepatitis. If the hepatitis is sufficiently pronounced the swollen liver can scarcely be differentiated from a distended gall bladder if we rely on preoperative palpation alone. In this particular patient the mass was so similar to the form of a distended gall bladder that I scarcely hesitate in making the diagnosis of either hydrops or empyema of the gall bladder due to an impacted stone. The impaction has evidently been relieved spontaneously. We shall try to protect the patient against subsequent attacks by removing the obstructive stone.

The physical examination of the patient reveals another set of symptoms that are of interesting and at the same time of grave significance. There is marked dulness over the manubrium sterni and upper midthorax extending to the right and left over a semicircular area (about 4 inch in diameter). Fluoroscopic and roentgenographic study discloses a mass that has none of the characters of an aneurysm of the aorta. We are inclined to think that we are dealing with a dermoid of the mediastinum. The patient is undoubtedly nervous and has a persistently high pulse even after the subsidence of fever so it may be that the mass is a goiter and that his high pulse rate and nervousness are symptoms of a toxic intrathoracic goiter. This much is certain. We should not have decided to perform a grave abdominal operation upon this patient except for the relief of what we could be life threatening intra abdominal lesion. We believe we are dealing with infected and intermittently obstructed gall bladder with possibly an early cholangitis complicated by a dermoid of the mediastinum rather than

APPENDICITIS

THE clinic this morning will be devoted to appendicitis. The selection of that fairly shop worn article—the appendix—as a topic does not embarrass me because we are fortunate in being able to present to you 3 or 4 cases illustrating rather unusual and yet very important phases of the disease.

The first patient, a girl sixteen years old, was admitted four hours ago. I saw her first about six hours ago in consultation with her doctor who has been watching her since last night. The doctor very correctly had made a diagnosis of acute appendicitis. When he saw the child she had been suffering for two days with abdominal pain, the severity of which had gradually increased and was accompanied by rigidity of the right rectus, elevation of temperature to 101° F., a pulse of 110, a history of nausea and vomiting and exquisite tenderness over McBurney's point. When I saw the patient a few hours later the temperature was 99° F., the tenderness and rigidity not demonstrable, the pulse rate 100 and the only remaining symptom a trifling amount of pain over the lower left rectus. The chest was clear and the physical examination in general was negative but the face of the child expressed peritonism. I advised the parents to send the child into the hospital where I would give my final opinion.

Half an hour after arrival in the hospital the temperature was again 101° F., the tenderness over McBurney's point was marked and there was in addition tenderness over the whole lower abdomen. The pulse was 114 and the child looked distinctly sick. It seemed certain that the sequence of events was as follows. When the doctor first saw the patient she was suffering with an acutely inflamed appendix with all the classical attendant symptoms. When I saw her six hours later the appendix had become gangrenous with consequent abatement of some and complete cessation of other symptoms (the so-called calm before the storm stage). The reappearance of

and close the incision in the common duct around the catheter. Now I ligate the cystic stump. I place a small rubber dam drain against the opening in the common duct and proceed to close the abdominal wound. I shall be ten minutes more closing the wound. The operation so far has lasted only thirty minutes. The patient's pulse is 150. I fear the outcome in spite of what we may be able to accomplish by the most careful postoperative treatment.

Statement to Students a Week Later—The patient reacted fairly well and I should have considered him in fair shape during the first eighteen hours after operation except for a suspiciously high pulse rate ranging around 130. There was no corroborative evidence of concealed hemorrhage and I concluded that the rapid pulse was merely an expression of hyperthyroidism referable to the intrathoracic mass which by this time I had become fairly convinced was a goiter. Large quantities of water by mouth and rectum ran over the heart. Morphine and digitalis were without avail. The pulse mounted rapidly to 180. The patient was alert and uncontrollably restless. He finally passed into stupor and from this into coma that lasted only a short while before death occurred.

An autopsy revealed an intrathoracic goiter the size of a adult fist. The operative field was clean and apparently perfect. To my chagrin however when the bile-ducts were opened there were two small stones in the retroduodenal portion of the common duct and another small stone impacted in the papilla of Vater. You will remember that you saw me pass a large bulb pointed probe through the common duct into the duodenum. I alluded to you at the operation that I could palpate no remaining stones in the common duct. The stones were not palpable even at autopsy but when the duct was slit down into the duodenum there the stones were. Stephen Paget has written an essay entitled "Wreaths and Crosses of Prati." Our looked gall-stones are the cross that some of us unfortunately have to carry. I know not how to lighten the burden.

Now let us examine the appendix. You will note that the whole organ is deeply congested. The upper third is almost formless and pulpy in consistency, blue black, and at this spot shows a ragged perforation. On slitting the appendix open we find the entire mucosa gangrenous. Otherwise there is nothing noteworthy.

While the dressing is being applied just a word about the operative indication and the postoperative treatment. I have set for myself this general rule to cover operations on true diabetics. I rarely perform an operation on a diabetic even though the patient has been sugar free for two or three years unless there is a definitely imperative reason calling for operation. In other words I have a very wholesome respect for diabetics as surgical risks, everything in the literature to the contrary notwithstanding. I never consider these patients as free from or capable of being made free from the risk of postoperative coma. Wound infection is not much of a bugbear to me but I know that I cannot always control or avert acidosis and coma. When the condition of the patient imperatively demands operation when for example a perforative peritonitis or strangulation of a hernia threatens I set the idea of diabetes aside and proceed as I would with any other patient after doing all I can in a preoperative way to combat acidosis by the administration of alkalis and regulation of diet if time permits.

When we come to the topic of postoperative treatment I frankly admit to you my confused state of mind. Fifteen years ago we trusted in the doctrine that a fairly high carbohydrate diet was the surest safeguard against postoperative coma. Our intelligent friends notwithstanding. And yet when my diabetic patients are seriously threatened with postoperative coma my internistic colleagues give them glucose intravenously some time with startlingly beneficial result. Read the editorial in the Journal of the American Medical Association (April 15 1922) appropriately entitled "Changing Tendencies in the Dietotherapy of Diabetics."

The child shall be given water freely for two or three days and practically nothing else except possibly weak unsweetened

symptoms in aggravated degree and severity means an early peritonitis. On the basis of this reasoning I have decided to operate immediately.

The child was unable to void urine owing to the fact that she passed a large quantity of urine just before admission. Under such circumstances I ordinarily would have paid scant attention to the urine but I ordered this patient catheterized because I knew that her nine-year-old brother had died of diabetes two years ago. An examination of the urine showed about 5 per cent of sugar. For a short while this caused me much concern but on second thought I have decided that we dare not postpone operation. If our reasoning is correct we are just at the last turn of the road where we can either head off a spreading peritonitis or permit it to head off the patient. So we shall operate and try and control the serious postoperative possibilities of acidosis as best we can.

I make a 3 inch incision over the right rectus muscle just below the umbilicus. I now divide the anterior rectus sheath and retract the belly of the muscle inward. I now incise the peritoneum. You can all see the escape of this dirty grayish green seropurulent fluid and if you were close enough you could detect the fecal odor. I shall gently pack off the general peritoneal cavity for I believe this exudate is limited by adhesions even though it is escaping freely. I now insert my index finger and in the depth of the wound I palpate a muhly appendix. There it is delivered totally gangrenous with a thickened mesentery that shines with edema. He near the middle of the appendix is a perforation. I tie off the mesentericocolum and the base of the appendix with chromicized catgut carefully pick to avoid soiling clamp distal to the ligature cut between ligature and clamp carefully rob the appendix stump with pure carbolic acid and let it drop back into the peritoneal cavity. Now I place a long drain of rubber- dam reaching from the pelvis upward long mesentericocolum and stump and out through the lower angle of the wound. You can see the pelvic seropurulent fluid gush out long distance from the drain. A layer suture of the wound completes the operation.

winter a peculiar type of otitis media. Many patients have had perforation of the tympanum without any premonitory ear pain, redness, or bulging either of the drum itself or of Shrapnell's membrane.

In this instance the vomiting and the fever were referable to the middle ear inflammation. The abdominal distress was either a simple stomachache or was the type of abdominal pain that we see so frequently as an accompaniment of acute infectious disease in children. Had I known that there was a double acute otitis media present I should have been willing to defer the abdominal operation until the effects of paracentesis had been noted. With circumstances just as they were I see no way by which I might have altered the course that I pursued.

This next case is a young man of twenty-six whom I sent into the hospital four days ago for observation. I was called to see him late at night and found him in very acute pain, localized over the lower abdomen, with exquisite tenderness over McBurney's point and all the classical symptoms of acute appendicitis. In addition to his other symptoms, however, he showed a marked purpuric rash over both cheeks. The purpuric effusion punctate in character was also located on the hard palate. The absence of any hemorrhagic effusion about the lid led me to believe that we were not dealing with vascular rupture and extravasation due to the severe vomiting which ushered in his attack. I inclined rather toward the belief that we were dealing with an essential purpura and that the abdominal symptoms were due to an accompanying peritoneal purpura. I therefore have not operated upon the patient.

Three days of observation tend to confirm this view. The morning after admission the rash began to fade. It is now as you see, light, iron-rust brown color. Hand in hand with the disappearance of the rash all the other symptoms disappeared, thus furnishing rather strong justification for assuming that the patient was suffering with peritoneal purpura.

It is better to follow Osler and call this disease visceral leishmaniasis of the erythema group, or we may call it a visceral crisis.

tea and albumen water. She will receive sodium bicarbonate (3 per cent) by per os. At the end of this time we shall be in a position to know more her sugar output and blood sugar content and we shall govern ourselves accordingly. Just now we know nothing except that her brother died of diabetes during childhood and that there was 5 per cent of sugar in the only specimen of her urine that we have obtained.

The remainder of clinic period I shall spend demonstrating to you 3 other patients who were admitted to the hospital within the past two weeks. These 3 patients were all admitted with the diagnosis of acute appendicitis.

This young girl nine years old has a history of suffering with slight abdominal cramps without nausea vomiting chill or fever for the past three years. The attacks occurred once or twice a year. Her mother invariably called me but I never could determine anything that warranted a serious suspicion of appendicitis. One of our best internists always supported me in my conservative attitude.

Ten days ago during convalescence from influenza the child suddenly complained of cramps. This time however there was intractable vomiting an elevation of the temperature to 101° F and minimal tenderness over the lower abdomen. In all other details the physical examination was negative. Even the white cell count was low. It seemed to me that there was a slight dulness of hearing so I asked for consultation with an otologist. He reported that neither middle-ear examination showed anything abnormal.

I felt that there was no moral justification in postponing operation. Appendicitis in young childhood is a serious disease and I did not care to take the risk of waiting until signs of perforative peritonitis made the clinical picture clear.

At operation ten days ago I removed a perfectly normal appendix. The cramps continued and we were after peritonitis. The vomiting persisted and the temperature continued high until both abdominal walls were incised and two middle basins were evacuated. There has been no peritonitis in St. Louis this

winter a peculiar type of otitis media. Many patients have had perforation of the tympanum without any premonitory ear pain, redness or bulging either of the drum itself or of Shrapnell's membrane.

In this instance the vomiting and the fever were referable to the middle ear inflammation. The abdominal distress was either a simple stomachache or was the type of abdominal pain that we see so frequently as an accompaniment of acute infectious disease in children. Had I known that there was a double acute otitis media present I should have been willing to defer the abdominal operation until the effects of paracentesis had been noted. With circumstances just as they were I see no way by which I might have altered the course that I pursued.

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Three days of observation tend to confirm this view. The morning after admission the rash began to fade. It is now as you see a light iron-rust brown color. Hand in hand with the disappearance of the rash all the other symptoms disappeared, thus furnishing rather strong justification for assuming that the patient is suffering with peritoneal purpura.

It is better to follow Osler and call this disease a visceral lesion of the erythema group or we may call it a visceral crisis.

tea and albumen water. She will receive sodium bicarbonate (3 per cent) by proctoclysis. At the end of this time we shall be in a position to know more her sugar output and blood sugar content and we shall govern our selves accordingly. Just now we know nothing except that her brother died of diabetes during childhood and that there was 5 per cent of sugar in the only specimen of her urine that we have obtained.

The remainder of clinic period I shall spend demonstrating to you 3 other patients who were admitted to the hospital within the past two weeks. These 3 patients were all admitted with the diagnosis of acute appendicitis.

This young girl nine years old has a history of suffering with slight abdominal cramps without nausea vomiting chill or fever for the past three years. The attacks occurred once or twice a year. Her mother invariably called me but I never could determine anything that warranted a serious suspicion of appendicitis. One of our best internists always supported me in my conservative attitude.

Ten days ago during convalescence from influenza the child suddenly complained of cramps. This time however there was intractable vomiting an elevation of the temperature to 101 F and minimal tenderness over the lower abdomen. In all other details the physical examination was negative. Even the white cell count was low. It seemed to me that there was a slight dulness of hearing. I asked for consultation with an otolaryngologist who reported that neither middle-ear examinations showed anything abnormal.

I felt that there was no moral justification in postponing operation. Appendicitis in young childhood is a serious disease and I did not care to take the risk of waiting until serious perforative peritonitis made the clinical picture clear.

At operation ten days ago I removed a perfectly normal appendix. The cramp continued and persisted after operation. The vomiting persisted and the temperature continued high until both ear-drums were incised and two middle ear abscesses were evacuated. There has been no patient at St. Louis this

CLINIC OF DR. FRED J. TAUSSIG

BAR AND FREE SAIN AND CANCER HO PITAL

CHRONIC LEUKOPLAKIC VULVITIS FOLLOWED BY CANCER

ONE of the most promising fields in the clinical investigation of the cancer problem is the study of those diseases and conditions that precede and apparently predispose to the formation of the tumor. *Hardly anywhere in the human body do we find so definite an example of this as in cancer of the external genitals of women.*

The patient I have to present to you today may well serve to illustrate this point. She is a woman sixty five years of age who has had four normal confinements and as far as can be elicited did not at any time have any pelvic infection. At the age of fifty she had entered the menopause and since that time has had no trace of vaginal bleeding. For the last year she has had a steadily increasing pruritus of the vulva that has in the last 12 months been almost uncontrollable. At nighttime and in hot weather it has been particularly annoying and her sleep has been greatly disturbed by the persistent itching. Various anesthetic ointments and lotions some of them containing carbolic acid some containing cocaine or its derivatives have been employed with slight if any relief. No increased frequency or pain on urination has existed but the flow of urine over the irritated vulva has given rise to a severe burning sensation that was only partly alleviated by cold applications. The urine shows no trace of sugar or other abnormal ingredients. Outside of increased nervousness from loss of sleep there has been no special change in her general condition.

On examination we find a woman somewhat below the average in weight with a markedly flabby tone to her skin. Her

caused by erythema purpura or by angioneurotic edema. Case histories such as the one presented by this young man are not as uncommon as one would think. It is vitally important for every surgeon to be familiar with visceral crises due to angioneurotic disease. I cannot go into details with you today. I can only caution you that in all instances of severe abdominal pain where the disease does not conform to true surgical types careful attention should be centered on a history of urticaria, erythema purpura or angioneurotic edema. And I can with real enthusiasm advise you to read Ollers' article in the American Journal of Medical Sciences 1904 page 1 and also Crispin's article in Volume VII of the Collected Papers of the Mayo Clinic page 823.

hypodermics of corpus luteum extract has apparently caused definite improvement of the pruritus although the local lesions remained unchanged. Such a beneficial effect from corpus luteum has been noted by others. X-ray and radium have been extensively tried out in the treatment of leukoplakic vulvitis. Occasionally a case has been cured by this form of treatment but results are very uncertain and if enough ray treatment is given to cause superficial desquamation of the skin the resulting pain is so great that the cure is almost worse than the disease. In the 5 cases in which I used ray treatment I never succeeded in effecting a permanent cure.

Our choice of treatment must therefore lie elsewhere and we are fortunate in having in surgical ablation of the entire vulvar skin a relatively simple and effective measure. There is another very important reason why surgery is to be preferred to other form of treatment and that is the high frequency of malignant change subsequent to leukoplakic vulvitis. These lesions as will be more fully elucidated are definitely to be classed as precancerous and the complete removal of the irritated area is therefore doubly justified. Fortunately there is but a little tendency for a recurrence after operation and where a small area of leukoplakia returns this is usually due to an incomplete excision.

To appreciate more exactly the nature of this condition it is necessary to study the histopathology that accompanies it. Let us first look at a section of normal vulvar skin after the menopause. You will note (Fig. 606) that there is a considerable decrease in the thickness of the epithelial covering and a lowering of the papillary processes that it sends down into the dermis. The blood supply is lessened and the connective tissue has coarser fibrils. Nevertheless a stain for elastic tissue shows that even directly under the basement membrane of the epithelium there is an ample supply of elastic fibers.

Next let us look at a section taken from a case of simple pruritus vulvæ (Fig. 607). Here you will note marked evidence of irritation. The epidermis is thickened and sends broad deep papillary projections into the dermis. An increase of the eleidin

blood pressure 160 systolic and 100 diastolic. The findings are negative. Abdomen relaxed. Vagino-abdominal examination reveals a short smooth vagina and atrophic uterus in good position and adnexa that can barely be palpated on account of their small size. Of special interest is the appearance of the external genital. You will be struck by the small amount of subcutaneous fat thereby producing a somewhat shriveled appearance to the labia, yet there is still visible a definite fold of the labia minora and a projecting tubercle at the site of the clitoris. These points will be more fully discussed later when I speak of the condition called krauro. Most striking are the changes in color and texture of the vulvar skin. Note first of all that the area involved extends symmetrically from the prepuce of the clitoris to the upper margin of the anal rim and involves both labia minora, the inner surface of both labia majora and a triangular portion of the perineal skin. Compared with the surrounding area this diseased skin has a grayish in part whitish or pinkish white appearance with here and there a red line where abrasions or cracks have occurred as a result of the brittle skin and the rubbing and scratching induced by the itching. Picking up this skin between two fingers you will be further struck by its dryness and the parchment like feel. There is none of the pliability or moisture ordinarily found in the vulvar skin. Pressure produces soreness but no definite pain. Washing with a cotton pledget gives rise to burning. No definite points of ulceration or localized nodules exist. I will later demonstrate a few microscopic sections from a similar case that will give proof of the fact that we are here dealing with a chronic inflammatory process of the skin. From its gross appearance this would not be evident. It is because of the whitish plaque like character of the lining that the term leukoplakic vulvitis has been applied to this condition.

The treatment of leukoplakic vulvitis is preferably surgical. I have already spoken of the failure of anesthetic ointments, ointments to give more than partial relief. A combination of 5 per cent anesthetic with zinc ointment has in my experience been occasionally satisfactory. In 2 patients relief

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layer is to be noted. In the dermis marked round-cell infiltration is present with some edema and enlargement of the blood vessels. The elastic tissue however undergoes no appreciable change and is plentiful between the papillae. The tissue from which this section was taken was a piece of perineal skin that in gross appearance was thickened and lightly grayish in color. In differential diagnosis it is not always easy to distinguish between pruritus vulvæ and the earlier stages of leukoplakic vulvitis. Simple pruritus vulvæ is more often found in middle

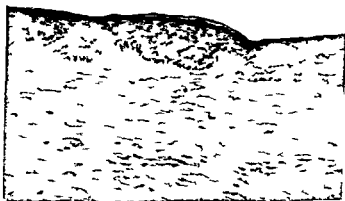


Fig. 606.—Section of vulva showing marked leukoplakic changes. The epidermis is thickened and contains many leukocytes. The dermis shows some edema and leukocytic infiltration.

aged women with marked nocturnal discharge and is usually associated with leukorrhœa. The erosion is found around the introitus and over the perineum. The skin has many excoriations from scratching. It grows thicker and characteristically somewhat the color of lichen planus. Hence the term lichenification has been adopted to describe it.

On the other hand leukoplakic vulvitis has a wider distribution of the affected skin and is attended by pruritus. Erosion is a characteristic feature.

pronounced as in simple pruritus. Most characteristic is the peculiar parchment-like change in the skin. In the earlier stages this may not be pronounced but there is even then to be noted a whitish crackled glistering appearance in patches over

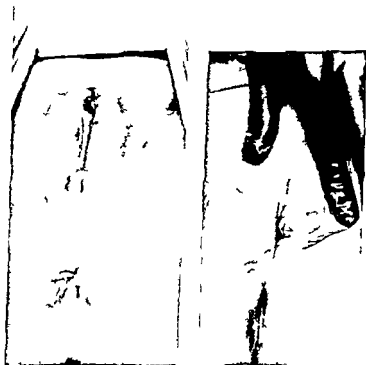


Fig. 607.—Skin of vulva showing the characteristic changes of chronic leukoplakic vulvitis. The skin is thickened, white, and cracked, with a parchment-like appearance. The changes are most pronounced in the central area, where the skin is fissured and the underlying tissue is exposed.

a diffusely reddened and oftentimes weeping vulvar skin. We may encounter various stages of the disease in one and the same individual.

Before proceeding with the description of the microscopic changes let me present to you the photographs of 2 other pa-

tients (Fig 608) more advanced cases of leukoplakic vulvitis with carcinoma of the vulva develop at one point. Note in both the marked atrophy of the external genitals. No trace of



A

B

Fig 608—Leukoplakic vulvitis with carcinoma of the vulva. A. Thinned vulva. B. Thinned vulva with carcinoma. The carcinoma is a large, dark, irregular mass on the vulva. The vulva is atrophic and the labia minora are small.

labia minora or majora. The fundus and the clitoris are atrophic to the size of a small bean. An attempt to introduce a finger into the vagina is attended by extreme pain and is practically impossible by the scale of the error in the

vestibulum. It is this pronounced shrinkage of vulvar skin that led to the term *kraurosis* as first employed by Breisky in describing this lesion. Breisky, however, made the mistake of considering the *kraurosis* the essential feature of the disease instead of merely an occasional sequel to the more advanced cases as we have now been made to realize. *Kraurosis* of the vulva as Berkeley and Bonney first emphasized is a term that should be applied to any case of marked sclerosis of the vestibule whether due to simple atrophic processes to syphilis, to sepsis or leukoplakic vulvitis. It is in married women where the abrasions resulting from an attempt at coitus leads to further scar tissue formation that *kraurosis* becomes more pronounced and necessitates incision and a plastic for its relief.

In a series of 70 advanced cases of leukoplakic vulvitis I found *kraurosis* present to a greater or less degree ten times. If we bear in mind that the *kraurosis* is the sequel the end result and not the disease itself we will do much to eliminate the confusion that is still to be found in many text books and journals in the discussion of this subject. Microscopically we find in *kraurosis* not associated with leukoplakic vulvitis merely the picture of pronounced scar tissue formation with moderate round cell infiltration but without the characteristic changes in epithelium, connective tissue and elastic fibers that are present in the latter.

The histologic changes in leukoplakic vulvitis are of great interest. Beginning with the epidermis (Fig. 609) you will observe in the early stages of the disease marked prolongation of the papillary bodies (acanthosis) and some thickening of the keratin layers (hyperkeratosis). As the disease progresses the epithelial layer becomes less compact and in the deeper layers assumes a somewhat frayed out appearance without definite basement membrane. The upper layer shows marked keratin formation so that this layer is often thicker than the remaining epithelium. A thick layer of cells containing eleidin, a deep staining pigment beneath the keratin layer is also characteristic.

In the dermis the changes are equally pronounced. At first we see hyperemia and diffuse round-cell infiltration especially be-

tween the papillary bodies. As the disease advances the connective tissue becomes swollen and loses many of its nuclei. It has a glassy appearance. The lymphocytes instead of being diffuse gather into bundles forming small lymph nodes. The elastic tissue completely disappears from the subepithelial area and is found clumped together at some distance below the surface of the skin (Fig. 610). It seems reasonable to ascribe to the elastic tissue



Fig. 609—Section of skin showing the changes in the elastic tissue. The elastic tissue is completely absent from the subepithelial area and is found clumped together at some distance below the surface of the skin. (Fig. 610). It seems reasonable to ascribe to the elastic tissue

sue the most important part in the change. It is absent in the upper layers of the skin, usually a little brittle, predisposing to cracks. It has not infrequently not much brittle in older individuals. Through such minute cracks, abrasions, bites, scratches and podocytes, inflammation with occasional pruritus and thus again through scratching tend to further break in the skin. In this way the cicatrization continues until the cicatrization changes largely described above.

Berkeley and Bonney speak of a final stage that shows sclerosis without inflammation but I have not been able to observe any such healed condition nor do I find definite evidence of it in their reports. On the contrary I am inclined to the

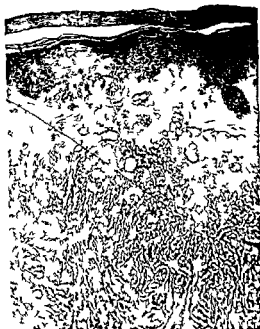


Fig 610—Se t f k l k pl k l t (d'a d t g)
 If th p d m m t ph with th h cat t frayed-o t
 ppe e d bsc f basem t m mb p t g t f m th d m
 Th hy l h g th ppe l y f th d m th b t f w l
 th lymphocyt pat h d th bse f l t t m
 m. k d h t t

view that leukoplakic vulvitis is a progressive inflammation without tendency to heal leading sooner or later if the individual lives long enough to the formation of a cancer. Further evidence to support this view is to be found in the fact that in

tween the papillary bodies. As the disease advances the connective tissue becomes swollen and loses many of its nuclei. It has a glassy appearance. The lymphocytes instead of being diffuse gather into bundles forming small lymph nodes. The lactiferous ducts completely disappear from the subepithelial area and are found clumped together at some distance below the surface of the skin (Fig. 610). It seems reasonable to ascribe to the elastic tissue



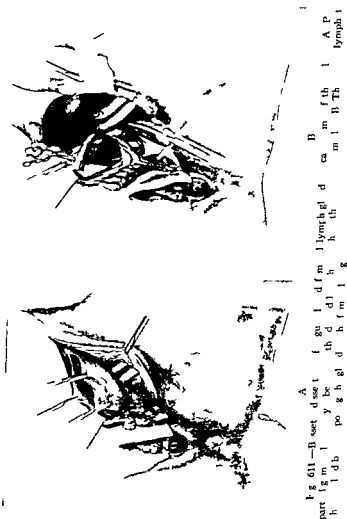
Fig. 609.—Section of skin showing the changes in the connective tissue. The connective tissue is markedly increased in cellularity and contains many small lymphoid follicles. The epidermis is thickened and the papillae are elongated. The ducts are dilated and contain secretions. The overall appearance is one of chronic inflammation and tissue remodeling.

is the most important part in the process. It is absent in the upper layers of the skin and would lead to brittleness and predispose to cracking. It is often infrequently noted in the brittle individuals. Through such minute cracks bacteria enter and produce inflammation of the connective tissue and thus again through cracking the condition further breaks down the skin. In this way the vicious circle continues until the extensive changes finally develop and result.

And now let us briefly consider the question of vulvar cancer. While the leukoplakic change just described is doubtless the most frequent etiologic factor in the disease we find particularly in those cancers of the vulva that develop in younger women other apparently predisposing lesions. I have been able to note in 2 cases a tertiary luetic scar in 1 case acuminate warts and in several others a fairly definite history of preceding trauma. In a further group no definite etiology could be established. Cancer of the vulva is attended by a very high final mortality chiefly because of the early involvement of a large network of tributary lymph glands. Unless the case is very far advanced involving the urethra or rectovaginal septum the excision of the primary growth is usually not difficult but the removal of the tributary lymph gland is a complex surgical problem attended with some primary operative mortality and with frequent recurrence in the more deeply situated pelvic glands. Only the most radical procedure give a high percentage of permanent cures. I would especially call your attention to the technique first described by Basset for the complete removal of femoral and inguinal lymph glands. As seen in the accompanying pictures (Fig 611) the most important advance Basset has made is the wide opening of the inguinal canal the exposure of the tissues to either side of the external iliac vessels in the iliac fossa and the cut through Poupart's ligament opening up the femoral ring. By such a wide exposure of the lymphatic chain one is enabled to remove in continuity the lymph gland to either side of the large vessel and more especially the gland situated just within the femoral ring so often involved in these cases and usually overlooked or incompletely removed when Poupart's ligament is not severed. It might be thought that this technique would be attended by a considerable number of hernias but such has not been my experience. The only hernia out of 10 cases thus far operated on by this technique was in a patient in whom one of my associates failed properly to approximate the muscles and fascia. The hernia was very small and has not required operation thus far.

To supplement such a surgical excision with deep x ray

14 out of 20 cases of leukoplakic vulvitis in my series a cancer



had already developed and that Ferruchet found 16 cancer in 19 cases of leukoplakic vulvitis.

CLINIC OF DR. ERNEST SACHS

WASHINGTON UNIVERSITY MEDICAL SCHOOL

FRACTURES OF THE SKULL

THIS patient (young woman) was struck by an automobile several months ago. She was picked up and reached the hospital in a few minutes. She was unconscious but not deeply so. When she was pinched or struck with a pin she mumbled incoherently. She was bleeding from both ears. There was a bruise over the right parietal region and a hematoma had formed which gave a hint of frequently the impression of a depression. Her pupils were unequal but reacted to light. Ophthalmoscopic examination of her eye ground showed no abnormalities. The veins were not full or tortuous and there was no edema of the disks. Examination showed no other injuries. All cranial nerves as far as they could be examined (since she was unconscious of course no sensory tests could be made) were normal. Reflexes were equal in both arms but the right leg showed an ankle clonus and dorsal flexion of the big toe on plantar stimulation (a positive Babinski sign). The blood pressure was 120 and the pulse was 60 to 75. Temperature was normal.

The questions to decide in this case as in every case of head injury are the following:

1. What is the nature of the injury?
2. What treatment should be instituted?

It is an old saying but one which can never be emphasized too often that while in a fracture of the long bones the prime consideration is the injury to the bone in a skull fracture the important point is what has happened to the contents of the skull.

therapy or radium packs is advisable in most cases but to employ either radium or x ray as the sole form of treatment in cancer of the vulva is justified only when extreme old age or some serious complications serve to contraindicate operation. Only an occasional case has been cured by radiotherapy alone certainly not enough to justify this form of treatment in preference to radical surgery as above described.

In conclusion let me ask you to remember that pruritus in old women is a symptom requiring immediate careful examination. In the presence of leukoplakic change a vulvectomy should always be done and if cancer is already present nothing short of complete excision together with the removal of the tributary lymph gland and lymph channels is to be advised. This alone will reduce the high death rate now incident upon cancer of the vulva.

and frequently if much bone has been sacrificed a secondary bone plastic has to be done several weeks or months later to close the defect

What shall we do with depressed fractures? I feel very strongly that *all* depressed fracture even if the patient has no symptoms whatever should have the depressed fragment elevated for this type of cranial injury more frequently lead to serious later complication than any other—headache and epilepsy. This patient has obviously neither a compound fracture nor a depressed fracture

Intracranial hemorrhage results from injury to the middle meningeal artery and this picture is one of the most striking we see if it is not complicated by contusion and laceration of the brain. Patients with a middle meningeal hemorrhage are unconscious for a brief period and they regain consciousness and then gradually as the hemorrhage progresses relapse into unconsciousness and coma. With this second period of unconsciousness a striking progressive rise in blood pressure occurs. Whenever this picture is noted immediate operation is necessary. These blood pressure readings must be taken at frequent intervals and it has been routine with us that whenever a patient comes in with a suspected fracture of the skull the blood pressure is taken every five or ten minutes by a nurse who has been trained to take blood pressure. These blood pressure readings are taken so frequently because the changes result not from an arterial hemorrhage develop quickly. The difficult question to determine is which meningeal has given way. This must be determined by a careful neurologic examination. A pathologic toe reflex, an ankle or patellar clonus or a paralyzed arm are quite enough evidence to indicate the side on which to operate. In some cases there are no neurologic signs and in this case it may be necessary to explore both sides. The operation is carried out through a subtemporal decompression incision. This consists of a vertical incision in front of the ear. The fibers of the temporal muscle are split in the course of their fibers and then the skull is opened (Figs 612-614). If the middle meningeal is ruptured a blood clot will be encountered

Most text books discuss at great length the mechanism by which different types of fracture are produced. In my experience though this point is of great academic interest it does not help in either diagnosing or treating a case. For practical purposes I try to determine whether a fracture is compound or simple if compound whether the dura is opened or not. If the fracture is a simple one the most important point to my mind is whether the fracture is depressed or not and of lesser importance whether the fracture is in the vault or in the base though this distinction to my mind is far less important than one would be led to believe from reading the literature and let me just in passing emphasize that fractures of the base are by no means necessarily fatal—many of them recover.

The injuries to the cranial contents may be hemorrhage, contusion and laceration or that unfortunately greatly misused term—concussion. Any of these conditions may be associated with cerebral compression.

I shall now consider these various conditions and shall dispose of the simpler one first simpler because most men agree on the line of treatment. Every compound fracture should be debrided at once unless the patient is badly shocked. The signs of shock are pallor, cold and clammy hands and body, rapid running pulse and low blood pressure. If the patient is in this condition one may have to wait a few hours until the patient gets over his shock. The most effective way to overcome this shock is by the application of external heat, bicarbonate solution or still better a blood transfusion. When the blood pressure has come up and is nearly normal the patient may be considered out of the condition of shock.

The debridement must be radical and should include all traumatized debrided tissue. If the lacerated tissues should be excised and all pulped brain tissue should be removed. During the war debrided brain tissue was removed by means of a catheter and suction but though this is admirable for cleaning bullet tracks the superficial brain was lost of vital life. I have found a cleaned frontier by excising with knife. These wounds are always to be well up tight though drainage

and frequently if much bone has been sacrificed a secondary bone plastic has to be done several weeks or months later to close the defect

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and after this has been removed the foramen spinosum through which the middle meningeal enters the skull is plugged either with an ornitho root stick or bone wax or the artery itself may be tied or caught with a silver clip. But this patient has no signs of such a hemorrhage for though she is unconscious her coma is not deepening and her blood pressure shows no variation and no tendency to rise. We must therefore seek still farther for the condition she is suffering from before we can determine our course of treatment.



Fig. 612—Sketch showing the method of treating the hemorrhage by compression of the hemorrhoid.

She presents the typical picture of a severe contusion and laceration of the brain usually due to fracture though it is possible to have such a brain injury without fracture. The cases are the cases about which the great difference of opinion exists as to the proper treatment. If the patient is deeply unconscious and the blood pressure is not falling I believe the proper thing to do is to decompress them. The unconsciousness I believe is due in part to the injury and in part to the rapidly developing edema. It is with the idea of relieving the intracranial pressure.

that I decompress the e patients that is by the decompression the brain i given more room to expand That the brain is under increased pre ure and that thi lasts for a week or two is proved by the fact that such a subtemporal hernia bulges for a week or two and then flattens out

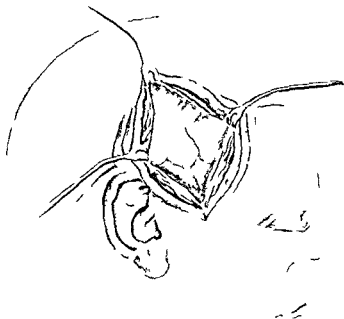
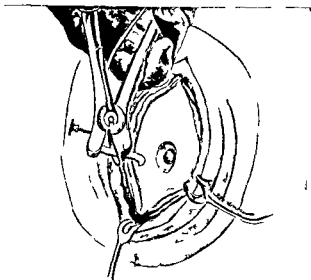


Fig 613—T mpo l m l pl t th l t fib d t t d w th
d mp t t

We took an x ray plate and this showed a linea f acture on the left s de of the he d in the parietal region The plate indi cated that the fra ture was not depre sed It is intere tinº to note that thou h the p ti nt was e vidently struck on the i ht side of the h ad th skull gave way on the opposite side and

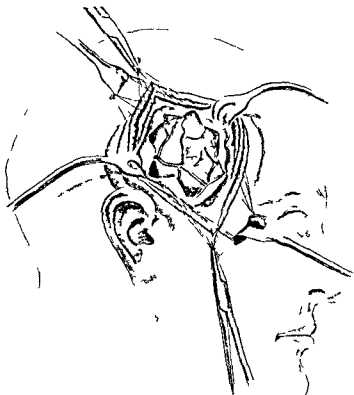
the neurologic signs pathologic reflexes on the right side indicated that the brain injury was on the left side the same side as the fracture. The determination of the side on which the injury occurred must always be determined by a study of the neurologic findings and not the site of the blow.



Fg 614—The killed by first mark small hole in the forehead
 The forehead was lacerated by the blow. The patient was
 brought to the hospital. The patient was found by the police.
 The patient was brought to the hospital. The patient was found by the police.
 The patient was brought to the hospital. The patient was found by the police.

When the patient is semiconscious this patient and
 show no signs of external hemorrhage it is well at and the
 the patient and the patient is not dead. The next day however
 the patient did not clear up. The patient was not
 occasionally. We still find improvement in the case
 is usually slow. On the next day however the patient's pulse
 which had been a usual 60 dropped to 40 to 48. Evidently

there was some cerebral compression and though the medullary centers at first seemed well able to take care of it they were be



Fg 615—Th d pe d by d l h fi t l y f t
h mpo l m l h be fl d p t p g th d ra Wh t
t po bl t d th l p b th thd g f
b p l fl d th d ry h lpf l th m m t th d pe d
b f h b ca b lg t h d g po t th t b m q kly
t d d th b d by l y f t mpo l m sel

gunning to be exhausted. I therefore immediately decided to relieve her into an analpnoea by a decompression operation. At operation the duodenum was found to be very tense and did not

pulsate. A small nick was made in the dura and immediately there spurted out yellowish fluid to the height of almost 2 feet. This reduced the intradural pressure and the dura was opened widely by several radial incisions and left open and the temporal muscle and temporal fascia were carefully closed in layers as well as the skin. No drain was inserted for I believe a brain wound should never be drained (Figs 615-617).

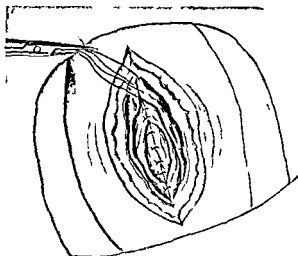
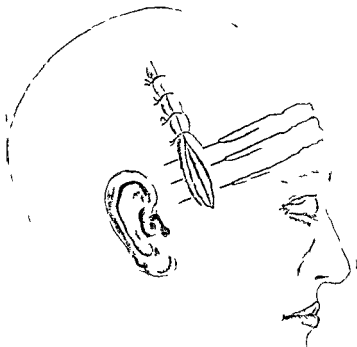


Fig 616.—The temporal muscle closed layer by layer with the temporal fascia sutured.

In this case the intradural pressure which was markedly increased was rapidly reduced by making the dura and letting fluid out but in many cases this is not possible and then the intradural pressure must be reduced by withdrawing cerebrospinal fluid from the ventricle. This may be done through the decompression wound by tapping the decompression horn of the lateral ventricle where it goes into the temporal lobe through the frontal region behind the anterior horn (Fig 618). Where one withdraws the fluid make little difference in the pressure.

tant point: that one must withdraw it before opening the dura for if one were to open the dura over a tight brain the cortex frequently ruptures and then a disastrous outcome will result. A decompression however *after the intradural pressure has been*



Fg 617—Th g l h be pp m d w th fi lk h f th
 ku t m ly h ld h p h l l dg t g th d b m d
 t ty f h th g g p t cally bl

duced is a harmless surgical procedure as I know. There are some who advocate lumbar puncture in fracture cases in order to reduce intracranial pressure. Personally I consider this a very unwarranted and unsafe procedure. I have seen 2 deaths my

pulsate. A small nick was made in the dura and immediately there spurted out yellowish fluid to the height of almost 2 feet. This reduced the intradural pressure and the dura was opened widely by several radial incisions and left open and the temporal muscle and temporal fascia were carefully closed in layer as well as the skin. No drain was inserted for I believe no brain wound should ever be drained (Figs 615-617)

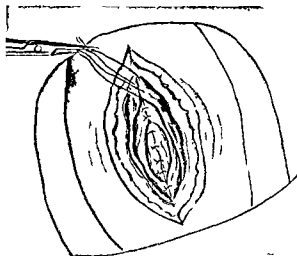


Fig 616—The temporal muscle closed layer by layer the temporal fascia in layers be properly approximated and the temporal muscle overlapped the fascia all together

In this case the intradural pressure which was markedly increased was readily reduced by making the dura and letting fluid out but in many cases this is not possible and then the intradural pressure is reduced by the drainage of cerebrospinal fluid from the ventricle. This may be done through the decompression would be by tapping the descending horn of the lateral ventricle here to osint the temporal lobe through the frontal lobe on the other hand the central point (Fig 618) Where now with the fluid makes little difference the tempo

tant point is that one must withdraw it before opening the dura for if one were to open the dura over a tight brain the cortex frequently ruptures and then a disastrous outcome will result. A decompression however *after the intradural pressure has been*

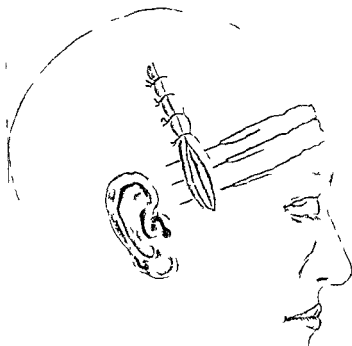


Fig 617—The glabella is the point between the eyebrows. It is the point of greatest thickness of the skull. It is the point of greatest thickness of the skull. It is the point of greatest thickness of the skull.

duced is as harmless a surgical procedure as I know. There are some who advocate lumbar puncture in fracture cases in order to reduce intracranial pressure. Personally I consider this a very unwelcome and unsafe procedure. I have seen 2 deaths my

self from lumbar puncture in fracture cases and there are many other unrecorded cases that I have heard of. The withdrawal of cerebrospinal fluid from the spinal meninges in a case of increased intracranial pressure permits the cerebellum to drop down on to the medulla and become jammed into the foramen



Fig 618 Method of dealing with the fracture of the skull in cases of increased intracranial pressure. The fracture is shown in the upper part of the skull, and the brain is shown in the lower part. The fracture is a comminuted fracture, and the bone fragments are displaced. The brain is shown to be compressed by the fracture fragments. The method of dealing with the fracture is shown in the lower part of the illustration, where the bone fragments are removed and the skull is opened up. The brain is then shown to be decompressed, and the fracture is repaired.

maximum and brain is held only for a few hours. The patient is then placed in a supine position.

In conclusion let me say a few words on the subject of concussion. The time honored term which has come to us through the ages. What is it? What are the symptoms and what is its pathology?

self from lumbar puncture in fracture cases and there are many other unrecorded cases that I have heard of. The withdrawal of cerebrospinal fluid from the spinal meninges in a case of increased intracranial pressure permits the cerebellum to drop down on to the medulla and become jammed into the foramen

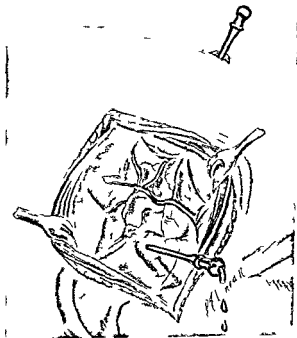


Fig 618—Method of using the O. di. sect d. thr. gh. th. mpo. l. l. be. h. h. d. sc. d. gh. f. h. l. t. l. t. l. f. h. dl. sect d. h. f. tal. g. h. h. mt. l. h. f. tal. l. be.

maneuver and bring on suddenly in a few hours a pretty good case.

In conclusion let me say a few words on the best of cases, that is, the ones that are the best of cases.

My own feeling is that the less the term is used the better for it is very confusing. In my own work the only case I am willing to call one of concussion is the individual who is hit or falls on his head and is momentarily unconscious gets up feels groggy may have a slow pulse for an hour and then goes about his business. Every injury more severe than this I consider is a contusion and laceration of the brain. I do not believe that patients die of concussion alone and consequently it is impossible to construct a pathology for it.

The intracranial manifestations of a fractured skull may therefore all be grouped under the headings

Compression

Contusion and laceration

Hemorrhage

This patient whom I have shown you had first a contusion and laceration and later developed symptoms of compression for which he was operated. Following operation she cleared up rapidly and was discharged about three weeks after her injury.

however reveals very loud second sound over the base extending well up into the large vessels. There are no further abnormalities. The extremities are normal with the exception of some evidence of a firm hypertrophic arthritis of the joints of the fingers.

Abdomen is flat flaccid no enlarged veins peristalsis is not visible. There are no palpable tumors or free fluid in the abdomen no hernia. Liver spleen and kidneys are not palpable. There are no points of marked tenderness upon deep pressure. The gall bladder and appendix region are both free from tenderness there is however some light muscular rigidity noticed on the right side just below the costal margin in the midclavicular line.

Blood pressure systolic 148 diastolic 90 pulse 80 per minute.

Blood Wassermann reaction negative W B C 8400 R B C 4350000 hemoglobin 0 per cent polymorphonuclears 59 per cent small lymphocytes 21 per cent large lymphocytes 16 per cent eosinophils 1 per cent transitional 3 per cent no abnormal red or white blood cells no malaria or miasms.

Urine Specific gravity 1.008 Albumin sugar negative Microscopic Moderate triple phosphate crystals few epithelial cells occasional red blood cells.

Gastric Analysis

Fast Content

Free H C L	0.0	1.1
Combined H C L	9	2
	—	—
Total acidity	9	9

Tetanic

Free H C L	0.0	2.5
Combined H C L	9	3.4
	—	—
Total acidity	9	

No detectable acid or occult blood

Fluoroscopic examination of the stomach as reported by Doctor Lyter showed that the barium passed rapidly from mouth into stomach. No abnormal finding about the esophagus. Stomach lies very high the lower border being at the umbilicus. The walls are distinctly hypertonic. At first there



Fig 619 — R y pl t ca m f tl t m h i t pe t

is a pronounced filling defect on the greater curvature near the pylorus. Other than this the wall are clear with no filling defects. The duodenum is visualized well throughout with a perfect cap. The duodenum is apparently fixed in position.

The x rays of the stomach which are shown for your inspection reveal the walls of the stomach clear with the exception of

the apparent filling defect in the greater curvature near the pylorus

Considering all of the evidence taken gastric analysis fluoroscopy x ray and history of the patient it seems probable that we have a carcinoma of the stomach with which to deal This woman is in the cancer age has lost weight and the other findings particularly x ray point to either ulcer or carcinoma

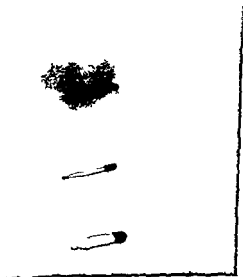


Fig 620 — Radiograph of stomach filling defect in gastro-

my

The incision is made to the right of the median line high up in the abdomen just below the inferior costal angle point somewhat below the umbilicus The gall bladder presents itself in the incision its walls do not seem to be very much thickened there are no adhesions within it the bile can be readily expressed There are omental adhesions but these adhesions can be easily freed and the specimen is freed after freeing same

The duodenum is fixed by adhesions and there is a tumor near the pylorus chiefly on the greater curvature of the stomach larger than a lemon. This is a crater like tumor firm and does not have the typical feel of a carcinoma. There are no enlarged glands along the greater curvature nor in the lesser curvature. The pancreas is soft and the tumor is movable. Adherent to this mass on the anterior wall of the stomach is the omentum it is plastered rather firmly to this point. It is possible that there may have been a perforation at some time and the omentum is adherent at this point as a result. I am not sure if this is a chronic indurated ulcer or carcinoma. At all events this seems to us a very suitable case for resection there are no very great mechanical difficulties to prevent such a procedure. If the tumor be carcinoma which it probably is it gives our patient the only chance for permanent recovery.

First we will free the omentum from its attachment to the tumor mass. Before doing this however we will place a few gauze pads around this area to prevent stomach contents being spilled in case the wall of the stomach is opened when the omentum is freed. Fortunately this does not open the wall of the stomach and there is no danger of pulling any stomach contents. The lesser peritoneal cavity is now opened and the finger can be passed behind the stomach and duodenum. We will first clamp the vessels along the lesser curvature of the stomach up to a point at which we will cut the stomach in two later. The vessels along the greater curvature are now caught in clamps and the gastrocolic omentum is severed between these clamps to the point on the greater curvature where the stomach will be cut in two later. These vessels are all ligated with catgut and now we free the duodenum to a point where we will apply a clamp around it before cutting it in two. The duodenum is caught in a clamp about an inch from the pylorus and a second and similar clamp is placed around the duodenum on the pyloric side. We now cut the duodenum in two with the cautery. We will place a purse string suture around the duodenum and tuck the stump in much as one does the appendix stump after appendectomy. We are using Dulox No. 1 catgut

the apparent filling defect in the greater curvature near the pylorus

Considering all of the evidence taken gastric analysis fluoroscopy x ray and history of the patient it seems probable that we have a carcinoma of the stomach with much to deal. This woman is in the cancer age has lost weight and the other findings particularly x ray point to either ulcer or carcinoma

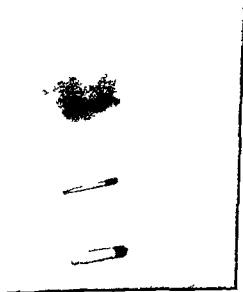


Fig. 620 — Ray plate of stomach filled with contrast medium

The incision made to the right of the median line high up in the abdomen from just below the ensiform cartilage to a point some inch below the umbilicus. The gall bladder presents itself in the incision. It is all joined to the body of the stomach. There are no stones within it. The bile can be readily expressed. There are mental adhesions to it. These adhesions can be easily freed and the incision is not interfering with

fluids per mouth for twenty four hours. She will get continuous proctoclysis by the Murphy drip method and she will be given 2000 c c of saline solution in 1 20 per cent novocain subcutaneously in twenty four hours. At the end of twenty four hours she will be allowed sips of water and the proctoclysis will be continued as long as comfortably retained. At the end of forty-eight hours she will be allowed an increasing amount of fluids at regular intervals.

Note—This patient left the hospital at the end of three weeks having had no untoward symptoms during her convalescence.

Pathologic Diagnosis—Carcinoma of the stomach

on a straight needle. A second suture of the same material passes a second row around the duodenum and to this is attached omentum so as to prevent leakage of the duodenal stump. We have wrapped as you see the pyloric end of the duodenum in a piece of gauze so as to prevent contamination the peritoneal cavity. Two large Kocher stomach clamps are now placed across the stomach at about the junction of the middle and upper fourth of same. We then cut the stomach in two between the clamps with the cautery. The end of the stomach is closed with three rows of sutures the first including and bringing the mucous membranes into apposition and Dulox No. 1 catgut is used. A second and third row of sutures are of the Lembert type and are both of Dulox catgut. We will now do a gastrojejunostomy. It is apparently somewhat difficult to bring into the incision enough of the posterior wall of the stomach to perform a posterior gastrojejunostomy because of the high position of the cardiac end of the stomach therefore we will do an anterior gastrojejunostomy. A portion of the anterior wall of the stomach is grasped in the Mayhew clamp near the greater curvature the jejunum is brought up and without putting any tension on it a Mayhew clamp is applied to the jejunum opposite its mesentery. The opening in the jejunum is made as necessary in a feasible without putting tension on it. We will do three row suture gastrojejunostomy in No. 0 extra hard Dulox catgut.

We now are ready to close the abdomen and this done in layers. The fascia and peritoneum are closed with chromic catgut three or four silkworm gut sutures. Sutured through all layers down to the peritoneum for the purpose of taking the tension off the suture line and then skin closed with clip.

Let us now have a look at the specimen which we have removed. This unquestionably a carcinoma has the rather typical appearance of same. Whether this tumor be carcinoma or ulcer undoubtedly the best preparation for this case is paraffin glycerol. The patient is a very good surgical risk and as you see has stood the operation very well.

When the patient is turned to bed she will receive

HOUR GLASS CONTRACTION OF STOMACH DUE TO ULCER

THE next patient is also a female aged fifty years married who came to the hospital in the Medical Service of Doctor J C Lyter three weeks ago. She was referred to the Surgical Service by Doctor Lyter with a diagnosis of gastric ulcer with hour glass contraction of the stomach. Her trouble began about two years ago with sharp cramping pain in the upper left quadrant of the abdomen at time this pain would radiate around to the small of the back. Pain was intermittent patient would go for several months without noticing any pain or serious digestive disturbance and suddenly pain would reappear with marked digestive disturbances. The duration of the attack which brought her to the hospital had existed five days.

The general history and examination of this patient reveal nothing of special interest. Her best weight was 115 pound her present weight 80 pounds.

Urine analysis at time of admission showed specific gravity 1021 albumin a trace a few hyaline and granular casts an occasional pus cell.

Blood examination showed hemoglobin 10 per cent color index 0.7 plus red cells 4 500 000 leukocytes 9500 small leukocytes 17 per cent large leukocytes 10 per cent endothelial 3 polynuclear neutrophils 70 per cent Wassermann negative. Stool showed red blood cells.

The fluoroscopic examination of the stomach made just after her admission into the hospital by Doctor Lyter showed about one third of the barium meal remaining in the stomach the rest being in the ilium and cecum. Upon being refilled the lower border of the stomach was shown to lie 2 inches below the crest of the ilium. It also showed a typical hour glass stomach. There is a niche about the middle of the lesser curvature which has all the evidence of a perforation. The duodenum was well visualized with perfect cap. The upper part of the stomach could not be moved.

tonitis and no indication for immediate operation. She was given sodium bicarbonate and glucose 5 per cent per rectum by the Murphy drip method. She was also given 2000 c.c. of normal salt solution in $\frac{1}{2}$ per cent novocain subcutaneously by the drip method in each twenty four hours for three days. She improved gradually and a re examination of the stomach with fluoroscope three weeks following her admission with subsequent x ray plates showed what we considered a perforation at the site of the ulcer to have disappeared. The niche referred to above had closed but the hour glass contraction of the stomach remained.

We shall make an incision to the right of the median line from the ensiform cartilage to a point just below the umbilicus as was done in the preceding case. The stomach immediately comes into view and is greatly dilated it presents a typical hour glass appearance. The contraction seems to be about the middle of the stomach however the portion of the stomach above the constriction is a good deal larger than the pyloric end. In fact it is rather difficult to bring the upper pouch down sufficiently to have a good view of it. On the lesser curvature of the stomach about the middle of same is located a hard indurated mass this is tightly adherent to the pancreas. This indurated area has a diameter of 3 to 4 inches. The pylorus is wide open and there is no obstruction at this point. There is no evidence of ulcer around the pylorus or in the duodenum. The opening between the cardiac and pyloric pouch of the stomach is sufficiently large to permit of contents passing freely from one pouch to the other. We are now attempting to free the ulcer to some extent from its attachment to the pancreas and the gastrohepatic omentum. This is very difficult to do and so far we are not meeting with much success. We had hoped to be able to free the ulcer site destroy the ulcer with the cautery as recommended by Balfour and enfold the ulcer. However it seems that the indurated area is so large that it will be almost impossible to do this therefore we will perform a midgastric resection of the stomach. We will free the gastrocolic omentum from the greater curvature from the point on the pyloric side where we intend to cut the stomach in two up to

x Ray plates of the stomach made at the same time showed the duodenum throughout with a perfect cap. Each of the plates showed a marked hour glass stomach the contraction being at about the middle of the stomach. The x ray plates showed the niche referred to above on the lesser curvature and as you will see from these plate a perforation is very probable. The



Fig 621—x Ray plate of the glass contraction of the stomach before operation

opening between the upper and lower portions of the stomach as shown by the plates would seem to be the small

The patient at the time of entrance was a very ill and her condition was such that she was not considered a very good surgical risk. Consequently she was kept in bed and placed upon an ulcer diet. There was at the time no evidence of pe

wall to a point opposite the point where this suture is started. Then we begin at the same starting point and continue around toward the greater curvature around on the anterior wall until we come to the point where the opposite suture stopped. These are now tied together. The first suture which was left at the lesser curvature is now continued around on the anterior wall



Fig 622 ~Sam ft pe t

of the stomach and is a Lembert suture which brings into apposition the two sides. It is tied to the end of the suture which started originally on the greater curvature. We place now a few additional interrupted sutures along the anterior wall to reinforce the previous suture line. The gastroduodenal omentum is now brought up and fixed along the greater curvature and the gastrophrenic omentum along the lesser curvature. Gauze pads

the point on the cardiac side where we expect to cut it in two. The vessels are caught in clamps and ligated with catgut. We shall ligate the vessel in the gastrohepatic omentum to either side of the ulcer and expose the points on the greater curvature just referred to. The blood vessels are now ligated and we will attempt to free the ulcer. The indurated area of the stomach is rather tightly adherent to the pancreas and we will have to shave off the portion of the pancreas in order to free this ulcer. The ulcer area is now free and we can proceed with the resection. Large Kocher clamps are placed on the cardiac end of the stomach above the ulcer and we will cut the stomach in two between these clamps with the cautery. The cardiac and free end of the stomach are covered with gauze pads to prevent contamination of the peritoneal cavity. You see this is now easy to turn the stomach outward and downward in order to place the clamps on the pyloric end of the stomach. These clamps are placed just as were the ones on the cardiac portion of the stomach and again the stomach is cut in two with the cautery. We have removed at least one half of the stomach although it will be seen that at least 3 inches of the pyloric end of the stomach are left. This will give us plenty of room to do an anastomosis between the two ends of the stomach and probably will not interfere greatly with digestion afterward. After carefully packing off the area around the end of the stomach we bring the two ends of the stomach closely together and do an anastomosis just as we would in end to end intestinal anastomosis. The first suture begins at the greater curvature and brings to either the peritoneal surface. We use 00 extra hard catgut on a straight needle for this suture. The suture is placed when we reach the lesser curvature and a second one is now introduced similar to the first just completed. This suture is tied when we reach the lesser curvature and will not be continued around the anterior surface of the stomach. Then the rows are placed through all the layers of the stomach and brings to either the mucosa. This suture as you see is placed in the middle portion of the posterior wall of the stomach running upward to the lesser curvature and downward on the anterior

PLASTIC OPERATIONS ON NOSE AND FOREARM

THE last case which I wish to present is a female who entered the hospital some eighteen months ago at the age of fifteen for the correction of two bony deformities one a congenital deformity of the nose and the other an acquired deformity of the left forearm and wrist. She is 1 of 3 children the other 2 being perfectly normal in every respect. Her parents are both living and in good health. Family history negative throughout.

When the patient first entered the hospital she was greatly undernourished thin and very much embarrassed about her appearance. The photographs which I will pass around give a very good idea of her appearance upon entrance into the hospital. She looked more like a girl twelve years of age than fifteen. She objected to going to school and did not seek the association of other girls of her age because of her appearance.

An examination at the time showed that she had a marked depression of the nose at about the bridge of same. The columella was absent as was the lower portion of the septum. The nasal bones appeared as though they had been mashed in against the maxilla by a blow. The nares were almost completely blocked it was impossible for her to breathe with the mouth closed. The tonsils were greatly hypertrophied and filled with crypts which apparently discharged pus. Her left forearm hung at the side fixed at the wrist and twisted toward the radius. The left forearm was very much underdeveloped by reason of lack of use though the hand was about the size of its mate. The flexor muscles of the forearm were noticeably better developed than the extensors. The radius could be felt roughened nodular and bent almost at a right angle ventrally. The ulna protruded 2 inches beyond the curved radius. There was very little motion in the joint the hand was of little use to the patient in this position as it was impossible to straighten the wrist out or lift anything with it. The function of the fingers however was not greatly interfered with.

are removed and we close the abdomen in layers as was done in the previous case.

We have seen several cases of hour glass stomach in our clinic in the last two years. It is practically always an acquired condition the result usually of ulcer and most frequently this ulcer is situated in the lesser curvature. Occasionally hour glass stomach is seen as the result of carcinoma and it might be produced by some perigastric inflammatory condition which would cause adhesions producing the contraction. It is probable that hour glass stomach from simple ulcer is a more common condition than ordinarily supposed. Apparently it is found more often in females than in males. The diagnosis is one of the important triumphs of radiography. By this means only can an exact diagnosis of bilocular stomach be made before operation. It is necessary to have a careful fluoroscopic examination to either with plates before the diagnosis can be positively made. Hour glass contractions of the stomach are seen frequently during fluoroscopic examinations as the result of spasms either in the presence of ulcer or induced by food intake or some other cause. Repeated fluoroscopic examinations and plates however nearly always determine positively the presence of permanent hour glass contraction.

The type of operation performed in the case of hour glass stomach must depend largely upon the nature of the contraction. Several operations have been advised such as posterior gastro-enterostomy, gastro-astrostomy, double gastro-enterostomy and sleeve resection. In the present case it seems to us that a midgastric resection or sleeve resection would promise the best means out of our difficulty.

This patient will be given glucose sodium bicarbonate proctolytic and saline hyperdermal lavages. In twenty-four hours we will start sips of water frequently and soon after the amount of fluids will be increased until soft food can be taken.

Note—This patient male and uneventful recovery and five weeks after her operation she is eating freely of most food. She thought she stated that she could not take a very large quantity at a time therefore ate frequently. She had gained twenty-five pounds in weight.

PLASTIC OPERATIONS ON NOSE AND FOREARM

THE last case which I wish to present is a female who entered the hospital some eighteen months ago at the age of fifteen for the correction of two bony deformities one a congenital deformity of the nose and the other an acquired deformity of the left forearm and wrist. She is 1 of 3 children the other 2 being perfectly normal in every respect. Her parents are both living and in good health. Family history negative throughout.

When the patient first entered the hospital she was greatly undernourished thin and very much embarrassed about her appearance. The photographs which I will pass around give a very good idea of her appearance upon entrance into the hospital. She looked more like a girl twelve years of age than fifteen. She objected to going to school and did not seek the association of other girls of her age because of her appearance.

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Undoubtedly the nasal deformity was of congenital origin but the deformity of the forearm and wrist was acquired. The history of this deformity is rather interesting. When about two years of age according to her parents she had a number of furuncles on the left arm about the wrist. These were incised by her physician at the time though the infection at the wrist did not clear up for many weeks. In fact the sinus persisted for



Fig. 623—The photograph of the patient showing the deformity of the forearm and wrist.

more than a year following the beginning of the infection and this bony deformity which is shown in the photographs followed.

Before we start the operation on this patient let me briefly tell you what we have done to her to date. The first operation consisted of removing her tonsils and adenoids. Three weeks later the first operation on the nose and this consisted of breaking loose the nasal bones from the maxilla on either side.

and elevating the nasal bone with forceps thrust up into either nares so as to obtain space for the purpose of breathing and to correct the flattened appearance of the nose. Small incisions were made on either side of the nose near the junction of the nasal bones with the maxilla and with a chisel the nasal bone was broken loose from the maxillary bone on either side. Into each nares was pushed one jaw of a heavy cupped forceps so that the



Fig 624—A. The width of the nasal bone.

nasal bones could be pushed up from the maxillary bone. This could be readily done after the nasal bones were completely broken loose from the face. The nasal bones were held up in position and the nares kept open by the use of two metal prongs, one in either nares and attached to a specially constructed upper dental plate. These nasal prongs were kept in place for several weeks and when they were removed ample breathing space was afforded (Figs 625-626). Following this the girl was permitted

to go home for a period of three months. When she re-entered the hospital the improvement in her general appearance was most striking. She had gained weight, properly was sleeping well and breathed with the mouth closed all the time (Fig. 677).



Fig. 65—Showing deformity of mandible.

The next step in the number of operations necessary to correct the various deformities was the correction of the left forearm. The x-ray plate together with photographs clearly showed the deformity of the radius before treatment with the clonidine and the ulnar prosthesis of the carpus.

and extending down well under the tissue on the posterior aspect of the hand (Fig 628). We desired of course to keep out of the wrist joint if possible since there was present some motion in the joint we preferred to do the work outside the joint and this seemed not only possible but the wisest thing to do. Conse



Fig 626—Sh... d f m ty f

quently the radius and ulna were exposed through an incision on the extensor surface of the forearm bringing the deformed end of the radius well into view. We then removed a wedge-shaped piece of bone from the radius with the apex of the wedge on the ventral side of the bone. The apex of the wedge did not

include the ventral side of the bone thus making it possible to hold the radius in position without the use of any internal splints. Then approximately 2 inches of the end of the ulna corresponding to the extra length of same was removed. After this was done it was possible to put the hand back in normal position without difficulty. It was not necessary to place any splints upon the radius for the reason that a small shell of bone was left on the under surface which held it nicely in place. After



Fig. 62.—Showing position of forearm and hand with respect to splints with the hand in hyperextension. The bone healed rapidly and at the end of three or four weeks both passive and active motion was instituted in the wrist joint and in five weeks all splints were removed. The ray plate and photograph show the position of the hand and wrist flexion in this procedure (Fig. 69-637). At the present time the hand is practically nearly normal use of the hand though extension

the wound was closed the forearm and hand were kept in splints with the hand in hyperextension. The bone healed rapidly and at the end of three or four weeks both passive and active motion was instituted in the wrist joint and in five weeks all splints were removed. The ray plate and photograph show the position of the hand and wrist flexion in this procedure (Fig. 69-637). At the present time the hand is practically nearly normal use of the hand though extension

somewhat interfered with and pronation and rotation slightly. She states that he is attempting to play the piano and uses the hand for practically every purpose.

Evidently this deformity was due to the infection which interfered with the growth of the bone. Most likely the epiphysis



Fig 68—Showing deformity of forearm and hand. The deformity is due to infection of the epiphysis of the radius at the distal end.

on the ventral side of the radius at the distal end was interfered with and caused a destruction of the cartilage cells. Bidder showed by experience that injury to one side of the cartilage will stop the growth on that side but may allow the bone to develop on the opposite side thus producing a deformity such as was present in the case. Brooks showed in his study of

bone growth that the development in the ulna is from an epiphyseal line at the distal end while the radius develops from each end of the bone. Another factor in the production of this deformity may have been the pull of the flexor muscles probably the ulna was not involved in the disease and it grew to almost its normal length and pushed its way above the carpal



Fig. 629—x Ray plate of the forearm showing the deformity of the radius and ulna.

bones as the deformed radius pulled the wrist and hand toward the flexor surface of the forearm.

The operation which we are undertaking now is for the purpose of providing a columella to the nose. This we will do by taking a section from the median line of the upper lip. We will make an incision through the upper lip on either side of

the midline so as to obtain a section of the entire thickness of the lip about $\frac{1}{4}$ inch in width. We will place a long jawed forceps on either side of the lip and produce gentle pressure on



Fig 630—Sh g ppe f m d h d f l l g per t d
d l



Fig 631—Sh g m t f l p t t f l l w g pe t

the lip to prevent bleeding when the incisions are being made. The incision is brought well up to the point where the columella begins from the upper lip. We now trim the mucous membrane

from the point of the nose where we wish to attach the flap from the upper lip and suture this flap in place with two or three



Fig 632—Sh g m t f t f l l g perat



Fig 633—Sh g ppea f se d l p ft g sal bo d
co t g l m lla

dermal sutures. We will place a few dermal sutures along the edges of the flap so as to bring the mucous membrane and skin into position. You see this through the skin flap into the nares.

and leaves the outer portion of the columella covered with mucous membrane. Some surgeons have objected to this method of construction of the columella for the reason that it leaves the reddened mucous membrane on the outside but in our experience this soon assumes the same appearance as the skin and the reddened appearance of the mucous membrane is lost after two or three months. We now will sew the incisions in the lip from which the section was taken in the midline together. We are very careful to approximate the vermilion border accu-



Fig 634—Sam Fig 627 1 t 1

rately. This is a very simple method of reconstruction of the columella as you see and no deformity whatever is left in the upper lip as the structures are very elastic and the lip assumes the normal appearance in a very short time (Figs 633-634).

You will observe in this case that there is still some slight deformity of the nose. The bridge does not yet stand out as well as it should; there is a slight depression. In a couple of weeks I believe it would be well to take a piece of cartilage from the rib and place it in this depressed bridge so as to fill out this depression and probably we shall do this at a later date.

from the point of the nose where we wish to attach the flap from the upper lip and suture this flap in place with two or three



Fig 632—Showing method of extending flap to point



Fig 633—Showing appearance of nose and lip following salivary duct connection

dermal sutures. We will place a few dermal sutures along the edges of the flap in order to bring the mucous membrane and skin into position. You see this through the skin up into the nose.

CLINIC OF DR W T COUGHLIN

ST JOHN'S HOSPITAL

UNUNITED FRACTURE OF THE MANDIBLE

This patient is a farmer thirty five years of age who nineteen months ago was struck on the point of the chin by a hand pike fracturing the mandible on both sides in the region of the bicuspids. He has been under the care of surgeons and dentists ever since. He complains that he is still unable to chew that he is unable to close his mouth that his chin has practically disappeared that his back lower teeth on both sides but especially on the right side press against his tongue and make it sore. He has chewed no food since the day of his accident nor has he done any work since that time.

Previous History—Up to the time of the accident he has always been healthy except for a nervous breakdown from overwork four years ago. He has been fourteen years married and has 4 healthy children and there have been no miscarriages. He has never had any disease but that referred to his family history shows nothing remarkable and his Wassermann both blood and cerebro spinal fluid is negative.

Present Condition—The patient is somewhat emaciated his normal weight is 175 pounds his present weight is 135 pounds he is 5 feet 7 inches tall his complexion is pale his expression of eye is intelligent the lower half of face presents a rather peculiar expression—the mouth hangs loosely open and the lower incisors instead of projecting upward point forward and he in contact with the lower lip a little above its upper edge. There is some drooling of saliva. On either side where face gives place to neck behind and below the angle of the mouth there is a dimpled scar and on the right side at the bottom of the dimple are dried crusts that on the right is wider than that on the left.

It is now a matter of eighteen months since she first entered the hospital and the photographs will show you something of the progress that has been made in correcting her deformities to date. In this time she has gained weight, has grown rather rapidly, and is anxious to enter school and take part in the various activities in which girls of her age indulge.

and a little pus oozes out. We conclude that suppuration has probably existed around the fractured end and the right side still suppurates.

Comment—Now gentlemen here is a patient that has been an invalid in a very pitiable condition for over nineteen months and suffering from an accident which resulted in a bilateral fracture of the mandible. He sought surgical service immediately and after nineteen months treatment during which time he has taken ether four times and been subjected to surgical operations he is still an invalid in a pitiable condition. Most of this might have been prevented had this patient been treated according to the same principles as he would have been had he sustained a fracture of his femur or any of his long bones.

All fractures of the lower jaw which involve the tooth bearing portion are except in the edentulous to be regarded as compound fractures whether they appear to be such or not. It has long been well known that the first principle in the treatment of a compound fracture is early reduction as complete as possible which means replacement of broken fragments in as nearly normal position as possible and retention in that position while healing is going on and that furthermore ample provision must be made for drainage.

What would you think of a doctor who allowed a patient to go about with an unsplinted compound fracture of his tibia or who allowed a patient to lie in bed with an unreduced and unsplinted compound fracture of his thigh? It simply isn't done as they say in England. What would you think of a surgeon who would wire the ends of a broken femur together and then fail to apply some kind of outside splint? Again of course it isn't done. Then why is it that there are still surgeons who are willing to tie or plate two broken ends of a broken jaw to ether or tie together two teeth on opposite sides of a fracture line and then fail to immobilize the whole lower jaw? What can be easier than the immobilization of the lower jaw when provided with normal teeth and when there is an upper jaw similarly provided with teeth?

The patient himself provides the splint—if he brings a

One notes the almost complete absence of chin this is most marked as we raise the patient's head. We notice also that the posterior half of the face seems to pass directly on to neck no angle of jaw being apparent. His speech is much interfered with sounds as though he were holding some foreign body in his mouth while speaking and we notice in speaking that his lips do not touch each other. We ask him to close his mouth. The lips can be closed with effort but the teeth do not change their position nor does the chin come up. On asking him to open the mouth one notices a movement especially marked toward the angles of the jaw the chin drops a little more but on closing it comes to rest where it previously was—one might say apparently at the level of the hyoid bone—it almost reaches his Adam's apple. On looking into the mouth most striking is the almost horizontal position of the lower incisor and canine teeth and the lower molars lie close alongside his tongue. Notice the molars—only 2 on each side are present no bicuspids are visible. An interval of 2 cm separates the canine from the nearest molar on the left side perhaps $2\frac{1}{2}$ cm on the right side. The molars on the right side have their grinding surfaces turned almost toward the tongue and occupy a position within the plane of the corresponding upper teeth. This displacement inward of the molars is caused by displacement inward of the corresponding portions of the jaw. On the left side it is equal to the width of the teeth and on the right side a little more than this. One takes hold of the incisor teeth and finds that he can lift and lower them and the chin without causing any movement of the parts of the jaw containing the molars and on grasping the jaw in the molar region and going moving the portion of the jaw which carries the incisors we find two points of unnatural mobility one on either side in the region between the canine and the first molar. We know therefore that there is a solution of continuity of the bone on each side.

We examine again the case previously referred to. In the main on either side they correspond exactly with the point of unnatural mobility—they are firmly fixed to the bone in this region. We brush away the crusts from the teeth on the right side

unnecessarily Therefore we go well away from the line of fracture in seeking teeth around which to place our wire We usually select two on either side of the fracture line and wire those to corresponding teeth in the upper jaw and then we seek four sound teeth on the other side and wire these also This one can do whether he be dentist or surgeon I have never yet seen any harm come because of wiring the teeth A lot has been said about the loss of teeth because of wiring the jaws together

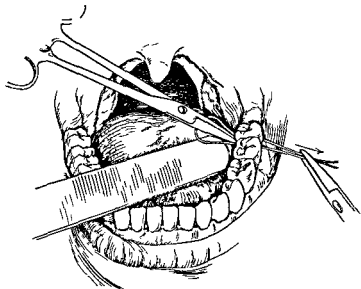


Fig 635 —Sh h w w passed f m th tw d B g: th th
tooth f rth t f m y

I believe if it is done in the following manner no trouble will arise For this operation general anesthesia must never be used because should the patient vomit afterward he may drown in his own vomitus before relief can come We can resort to nerve blocking or use local anesthesia even 10 per cent cocaine painted along the gums at the roots of the teeth will be a great aid and I have done it very many times without any anesthesia whatever

normal upper jaw with him. Fasten the lower jaw to the upper jaw and we can be assured that it is well planted. Immobilization of the fragments is absolutely necessary. The manner in which this is brought about does not matter provided immobilization is obtained.

The compound fracture does not always suppurate neither does the fracture of the jaw even though it be compound. However it very frequently suppurates. The infection comes from the mouth most often. These fractures often occur in people whose mouths are very filthy and in whom pyorrhea has existed for years but even though it be as clean as it is humanly possible to make it the mouth is still surgically very unclean hence we must rather expect infection in fractures of the jaw.

Now our methods of immobilization are many. It is well if possible to have the services of a dental college one who is accustomed to making splints preferred but whether he be accustomed to making splints or not he is not a trained surgeon. He should be subject to the orders of the surgeon in charge because here arise problems that call for surgical training and skill and nothing must be done which violates the fundamental principles of surgery. Splint and appliances of various kinds are desirable but they are a luxury. If the patient has teeth like this one has they can easily be done without. Most of the dental college graduates nearly all the medical know nothing of the manufacture of appliances.

We can immobilize the jaw by fastening the teeth in the lower jaw firmly to the teeth in the upper jaw. Let us see how this is done. We must suppose that the teeth that are near the line of fracture are involved in the fracture until such is proved to be not the case. In order to determine it satisfactorily an x-ray must be taken. It is true everyone who has an x-ray machine knows how to take a radiograph of the lower jaw but when it comes to the line it is possible to determine whether the teeth are involved in the line of fracture or not. If a tooth encroaches upon the line of fracture it is weakened and in addition a strain should be put upon the other side to make it

quently enough to keep his breath sweet. There is always more or less swelling and one must be on the lookout for infection. I do not advocate the immediate opening up and drainage of fractures of the jaw which involve the tooth bearing area but I do advocate the opening from below at the first sign of infection. The first sign of infection is a tender painful spot. Never

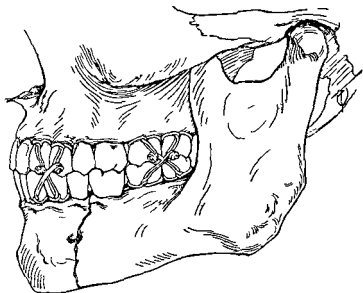


Fig 637—The tooth bearing part of the jaw is the most dangerous part of the fracture. It is the most dangerous part of the fracture because it is the most dangerous part of the fracture. It is the most dangerous part of the fracture because it is the most dangerous part of the fracture. It is the most dangerous part of the fracture because it is the most dangerous part of the fracture.

wait for fluctuation but whenever a tender painful spot appears at the site of fracture take the knife and open from below upward never from without inward cutting straight to the bone. Make an incision not more than 1 inch long pass the blade of knife close to the bone from below upward both on its outer aspect and its inner or if you are afraid to use the knife use a blunt dissector but stick close to the bone thus you open the

The instruments needed are a couple of pair of artery forceps scissors to cut the wire pliers if you like to twist the wire but heavy artery forceps will do. The wire used should be tough it should be non corrosive such as silver or aluminum bronze but I have often used ordinary florists wire which is iron and the gage is never coarser than 26 or 28.

In wiring first deal with the teeth in the upper jaws and always deal first with those farthest from you. Pass the wire from within outward and as the ends are being drawn taut an

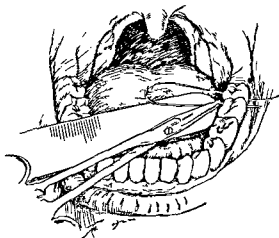


Fig 636—The tip of artery forceps held firmly against the lingual aspect of the tooth just where crown meets neck guides the loop to where it must be held the crown. The ends are then twisted and left alone. When all have been wired the teeth are placed in normal occlusion and the wires on the upper set are fastened to the one below.

a assistant with the tip of a closed artery forceps held against the lingual aspect of the tooth just where crown meets neck guides the loop to where it must be held the crown. The ends are then twisted and left alone. When all have been wired the teeth are placed in normal occlusion and the wires on the upper set are fastened to the one below.

After treatment—The patient is on a mouth wash and gargle. We oblige him to use it every hour by day and every two hours by night as long as there is discomfort. After three or four days he is enabled to eat only soft

one for the teeth in each fragment of the lower jaw. On the outer and inner aspects of each of these he has firmly soldered a number of hooks all turned downward. To these hooks will later be attached the elastics and wires above referred to. He will *not* cement these splints to the teeth which they are intended to fit on until the scar tissue is removed.

We must now excise all of the tissue from between and around the broken ends. We infiltrate the area of the scar with procain per cent to each ounce of which has been added 4 drops of 1/1000 adrenalin solution taking care (1) not to inject too rapidly (2) not to inject the tissues tightly (3) to be certain that the periosteum itself on both sides of the bone is injected and (4) that the tissues on all sides of the scar are infiltrated. The excision elliptic so that the edges will close in a straight line and almost all comes away in one piece. There remains a portion of scar on the deep aspect of the broken ends and it too is all cut out. The bone ends now lie quite bare you will notice how white and smooth they are—eburnated—they look like polished ivory. This is because they have been long inflamed—a pano testis has occurred here and dead bone has been separated from the living. The living bone remains but it bears about the same relation to normal bone that scar tissue does to normal tissue. We will not cut any of it away but we will drill a few small holes in the fragment ends. We now make a thorough hemostasis using the finest of plain catgut ligatures and tying only the largest purtlers the others are controlled by tension the minimum of foreign body is left in. The wound is now closed with figure of 8 silkworm gut and only one to each 1.5 cm is used.

The right side must now be dealt with. Here we find a sinus and in order that I may be able to follow it to its farthest limits I inject under pressure a 2 per cent aqueous solution of brilliant green. We formerly used methylene blue but the laundry complained of the permanence of the dye in the towels and sheets. We now infiltrate with the procain adrenalin as before and again we excise the scar. And now here on the outer aspect of the distal fragment we find our green dye in

line of fracture and drainage is assured. The wound in the bone thus treated will clean itself very quickly; there will never be necrosis of bone and osteomyelitis will never occur and lead to loss of substance and nonunion for that is what has happened to the patient just presented. He has had infection of the site of fracture, osteomyelitis, necrosis of bone and many operations; has lost 6 of his teeth and that part of his jaw which bore them; and the sad part of it is that he has been under treatment for nineteen months and is worse off than he was at first.

Our problem is to restore the bony continuity of this mandible in such a manner as to permit the jaw to function normally.

Referring to the radiograms we observe that a distinct interval separates the broken ends on either side and that the proximal fragments are displaced medially and that the distal fragment comprises the arch of the chin and that it is displaced downward and rotated on an axis passing transversely through the roots of the canines—the cutting edge of the incisors point forward almost horizontally. This is due partly to gravity but chiefly to the downward and backward pull of the platysma digastrics, geniohyoid and mylohyoid muscles. We will first of all be obliged to draw the fragments into their normal relation with those of the upper jaw. The teeth of the upper jaw are still in good condition so that we do not hesitate to use them for our fixed point of support.

Now we must call to our aid the dental colleague and I am fortunate in being able to avail myself of the advice of a very excellent one. He has constructed a set of splint—one for the upper jaw—all in one piece made by casting an impression taken in the usual way—a base stands out from its edge about $2\frac{1}{8}$ mm and is firmly soldered to the tooth bar which after being fastened by pieces of lastic by means of which will bring about reduction and till later the wires to maintain retention.

The dentist has cleaned all the teeth and the gums are all in fine condition for over a week. This splint he will now cement firmly in place on the upper teeth. I have known such a splint to remain firm in position for fifteen months.

He has also made three other upper mandibles and cast splints

that these wound have suppurated a long time and that the scar is dense and tough not vascular. Also it has been observed that scar tissue has harbored pus organisms for months. I know that the bone ends under such circumstances are hard and vascular and in addition the scar acts as a hindrance to reduction. Above all I am soon to graft bone here and I wish to have the bone ends and the surrounding soft tissues as soft and as vascular as it is possible to have them without actually having them inflamed. As healing progresses massage and baking will be instituted and in two or three weeks if all goes well the fragments will be in their normal position and the bone graft will be done.

BONE-GRAFT OF THE JAW

It is now six weeks since this patient was operated upon for the removal of the scar tissue between the bone ends and the wounds of that operation are firmly healed. The wound on the left side healed by first intention but that on the right side you remember opened into the oral cavity and in its depths was a focus of suppuration that had to be drained; it therefore took four weeks to close. The dental colleague applied elastic traction the day after the operation and within two weeks the displaced fragments had been drawn into their normal positions and now the wires take the place of the elastics and the splints on the lower teeth are firmly fixed by the wires to the splint on the upper teeth and thus the fragments are held with the teeth in normal occlusion.

We must now insert our graft so that eventually the continuity of the bone will be restored.

There are three good methods of doing this. First the method of Albee in which a slot 10 to 15 mm wide and 3 to 6 cm long is sawn in each fragment its long axis parallel with the long axis of the bone with a special saw and then from the tibia a piece of bone is cut comprising the whole thickness of the cortex and just wide enough to exactly fit into the slots cut in the fragments. It must be as long as the distance to be bridged plus the lengths of the slots. It is lifted from its bed and placed

granulation tissue and with the curet we easily scrape away the dyed granulations and presently we find the tip of the canine tooth itself quite eroded. The tooth must be removed. We are careful to first be sure that there is no further extension of the sinus and we search well removing all of the car tissue as before. We are quite satisfied the sinus leads to the root of the tooth and nowhere else. The root in question is only half in the bone as you can see most of the bone on its proximal aspect has been lost. In this instance I make no drill holes in the fragment ends even though they be if anything more white and hard than those on the other side. The reason is that here we have a sinus and pyogenic organisms and further more we are going to open the oral cavity. In such circumstances to drill or chip the bony ends is to court osteitis and he has already had nearly two years of it. We make good hemostasis as before and only partly close the wound leaving a Dakin tube as far as the socket of the canine. The tooth is easily extracted there are no splinters and no projecting edges so that the soft parts can easily obliterate the space and healing soon follow.

The dental colleague will now apply the splints on their respective lower teeth first on the molars of each side he cements them firmly. We now see the wisdom of delaying their application until the scar tissue has been excised. This splint for the middle fragment has caps for both the canine and the incisors and you see that we find it necessary just now to move the right canine what a noble one learns to a old as he gains experience! The dentist very quickly amputates that part of his splint intended to cover the missing canine and almost as quickly he cements the splint firmly to the remaining teeth in the upper fragment. He does not apply the elastics until the cement has well set. He assures me it will be firm in a few minutes but I persuade him to wait for at least twenty-four hours. The patient's mouth is washed well with Dakin solution every two hours by day and night.

Comment.—I am sure one of you are wondering just why I excised the scar. Well there are several reasons. I know

use of a straight piece of sufficient length. The second reason given, however, is the real one.

(Answering a question) No, the defect is not too long for the steperiosteal graft. I have bridged a gap 6 cm long with it.

Now first we will operate only one side because as I have repeatedly said, the anterior fragment is very short and should I uncover it too much from its surrounding soft parts as I must if I expose the fractured ends sufficiently on both sides, I shall seriously jeopardize its vitality and *primum non nocere* must be our motto.

Therefore, today I am going to do the bone graft according to the method of Delageniere on the left side and in three or four weeks if all goes well I shall perform a similar operation on the right side. In the meantime to the right side which you remember contained a suppurative focus we daily apply dry heat and massage in order to further insure the success of our future operation. Now the patient has been given two hours ago hypodermically $\frac{1}{4}$ grain of morphin sulphate and $\frac{1}{120}$ grain of atropin sulphate and one hour ago he received in the same way $\frac{1}{8}$ grain of morphin sulphate and $\frac{1}{120}$ grain of atropin sulphate. At our first operation he was somewhat nervous to begin his first experience with local anesthesia. Today he elects local and comes without the slightest apprehensions. (In answer to question) No, I shall never use scopolamin again. I have used it a great deal but I have learned to avoid it for ever. Nothing can ever persuade me to use even the smallest fraction of a grain in conjunction with morphin—the infiltration is carried on as before. We are not going to reopen the ear, however, although I must infiltrate the tissues underlying the bone ends. I do the same with those lying below the level of the jaw opposite this side. I am very careful not to thrust the needle into the mouth cavity, should I accidentally open the mouth cavity I shall discontinue the operation and try again later. I now incise below the lower border of the jaw parallel with it and about 2 to 3 cm away from it. The cut is at least 7 or 8 cm long and its anterior end goes almost to the median line. The flap is turned upward. It comprises the skin

in the slots and fastened in with absorbable suture material. It not only affords a scaffolding for new bone to bridge the gap upon but also acts as a stay or internal fixation apparatus while this is being done. It is excellent when the slots in the fragments can be placed so as to lie in the same straight line. (In this case you will remember our anterior fragment is short and both its ends pointed. It is obvious we must not bare it too much nor will it bear much slottin^g.)

Second there is the method much used in England by Coleman in which a piece of bone is cut from the lower border of one of the fragments long enough to more than bridge the gap throughout part except the skin are left attached to its lower border and it is then laid forward or backward as the case may be and its ends fastened to the corresponding fragments so as to make a good bone contact and bridge the defect. It is easily done and it is thought that the attached soft parts insure its vitality and make success more certain. It is of decided advantage for short defects and where the oral cavity is opened or where the wound suppurates from any other cause. If you doubt your skill it is the one to use for small defects.

The third method is that given to the French by Delage and more of Le Mans. I have used it more than any other because I like it better. It consists in taking a thin shaving of the cortical layer of bone with the underlying periosteum cut the desired length and width. After freshening the fragmented ends and turning back the periosteum on their inner and outer aspects for a distance of 1 to 3 cm this bit of shaving is placed on the inner aspect of the fragments. A similar piece is laid on the outer aspect of the fragment again making good contact of bone to bone and then a hole bit of having either with or without its periosteum is placed in the interval between the other two and just nicely touching each of the bone ends.

This third method is the one I have decided to use in this case because First it is more easily done. Second the anterior fragment is short and its ends are pointed and when attempting to repair I do not expect to run the risk of deforming more and third the contour of the jaw here does not lend itself to the

fragments and now I clean the bone ends on both aspects for at least 2 cm. A drill is now used to make two holes in each fragment. The holes made at the previous operation have been filled up and the bone drills very much more easily than it did before. It is more vascular. The holes are back 1 cm from

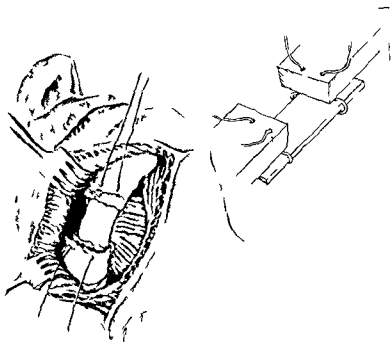


Fig 639—O f th lo g p l be l d t th p t
f th f gm t—d p o t t d d th p te m f th d
f th f gm t h b t d b k b y f t h b y f
l t l t t h w th g ft ca ght th tg t l p

the end and the top one is as high as it is safe to go for fear of injury to the mucous membrane. We guard with the metal protector lest the drill slip through and wound important structures. The lower holes are near the lower border. Now I shall pass a strand of catgut in through the upper and out

and platysma and as it is turned up the outer aspects of the fragments come into view. All purturing points are clamped

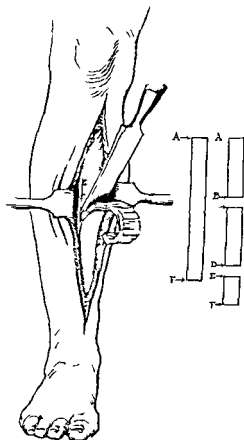


Fig. 638—A. h. h. g. f. b. o. th. ly. g. p. e. 100. m. is. used
f. m. h. n. n. e. r. f. f. t. b. i. a. l. < Th. p. A. F. three pieces
—t. l. g. d. h.

The knife no. b. re. the. b. ne. nd. H. little. car. t. l. s. is
present. tod. y. I. mu. t. n. h. l. r. t. n. th. d. p. a. p. e. c. t. of. the

surface of the tibia all the tissues to the bone are flooded. A linear incision about 20 cm long is made through the tissue down to but not through the periosteum. The bleeding is controlled. Good retraction is made exposing the whole width of the internal surface of the shaft of the tibia. An incision is

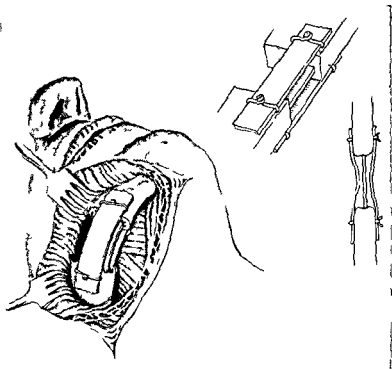


Fig 641—The na gl gp l d s t t t p t f
th f gm ts—p t m t t—catg t t d t d I t ll s—
t t th sam

now made through the periosteum about 5 mm behind the crest of the tibia and parallel with it from one end of the wound to the other. A second incision is made through the periosteum 2 cm behind or internal to the first and parallel with it. The ends of these parallel incisions are now connected by a transverse cut through the periosteum. A chisel 2 cm wide is now

through the lower hole in the anterior fragment and do the same with those in the posterior fragment. The loop of each strand I shall grasp in a separate forcep. I now make good hemostasis by torion if possible if not I must use only the finest of plain catgut for ligatures—the beds now ready for the grafts.

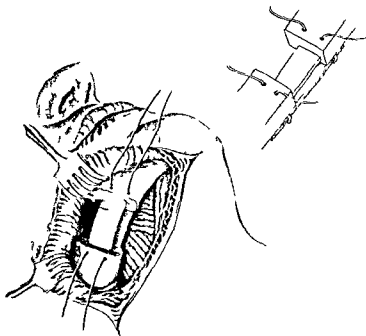


Fig 640—The short piece of tubing be fit exactly be
t the finger and I will bet them the h pet m
y please I set all the same

The left leg of the patient has been indy prepared. The
picric acid (5 in 95 per cent alcohol) has been painted on here.
We do not use it on the face but the thorax and for
many days hence the tinct of dim diluted with equal part
of alcohol was used there. A thin I infiltrate along the inner

CRANIOPLASTY WITH CARTILAGE

This patient is forty nine years old a laborer until 1916 when he was shot in the head suffering the loss of his right eye and a comminuted fracture of his skull in the right parietal region since then he has done no work.

He was operated on at once and recovered in some weeks. He soon after began to have twitching spells in his left hand. The spells increased in frequency and severity and involved the whole left arm and left side of his face. He did not at first lose consciousness during the attacks. Later he had regular epileptic seizures which always began in his left hand. He was operated in another clinic in 1917 and an attempt was made to close the defect in his skull with fascia and muscle transplant the surgeon considering it too large to repair with bone. His epilepsy was not improved and in 1919 he was again operated and a part of the motor cortex on the right side was removed. Since then he has had no more epilepsy but he is totally paralyzed in his left side. He also complains that he has dizzy spells and peculiar unpleasant feelings over the left side of his body. He has a great fear that something is going to strike him over the spot where his skull was fractured. He has severe headaches and attacks of insomnia.

Examination shows a depression in the right side of his head extending from within 1 cm. of the midline downward almost to the ear and its anteroposterior diameter is almost 7.5 cm. There is easily feelable brain pulsation at the bottom of this hollow. It is quite 2 cm. in depth at its center and it is crossed by two scars. He winces as the fingers pass over the scalp in this hollow although there is no sign of inflammation there. Intelligence normal.

His left eye reacts to light and accommodation and its fundus examination is negative. The right eye is missing.

used and beginning at the upper end is driven by gentle tapping and held at an angle of about 45 degrees. The bone having begun to curl up and it curls with the periosteum inward into a roll just as the shaving in ordinary carpentry. We take enough for the three pieces and cut it into the required lengths. We have two long pieces and a short one. It cuts easily with the bone shears. It is a little difficult to unfold and straighten. We take one of the long pieces. It has been cut 5 cm longer than the interval to be bridged. We pass one end of it—periosteum inward to the deep surface of the anterior fragment its end encircled by the loop of catgut previously placed there. Its posterior end is placed in similar relation with the posterior fragment and caught in that loop. The catgut loop is not tightened—not tied—and the graft is held firmly against the mother bones—bony surface to bony surface.

The other longer piece of graft is now laid on the outer aspects of the bone—periosteum outward. It need lie between the catgut strands as they emerge from the drilled holes. Each strand is not tied and thus the two grafts are held in place by the two strands of catgut ten-days. I now take the last fragment and slip it underneath the outer one into the space between the two and touching the mother bone.

We now close the wound with three figures of 8 silk suturen gut sutures and apply some pressure just below the joint at the site of operation. These measures lessen the likelihood of hematic or serous exudate—either of which in the neighborhood might easily nullify our day's work. The wound in the leg my assistant has already closed and dressed.

The right leg will be similarly dealt with at a later date.

the transplanted bone would always do as it ought and furnish the patient a scaffold over which his pericranium could build out a nice bridge or lid of bone to cover the defect all would be well and we would all soon use nothing but bone to cover these defects. But when bone is transplanted to the skull from almost any other region it ceases to functionate as it did before and it disappears before the defect is covered with new bone. This has happened to me repeatedly. When a piece is taken from the outer table of the skull if the defect is small or often even if it be quite large and used it grows into place and acts well

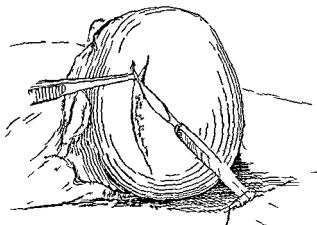


Fig 642—The scaffold completed

at least for a while. For a very large defect it is too large an operation to be undertaken especially as its success is doubtful.

Cartilage transplantation for the repair of bony defects about the head and face came into popularity during the Turco-Italian War. The late Doctor Morestin of Paris claimed to have been using it for upward of twenty years but Ceci of Pisa, Italy first called general attention to its utility for repairing these skeletal defects.

It is easily obtainable and can be so easily shaped to fit the desired contour that its use is at present fairly well recognized. As to its durability we cannot speak with great knowl-

There is a spastic paralysis of the left side of the body and face

The chest and abdomen show nothing abnormal. Appetite is good. Bowels normal. The urine is normal.

He acknowledges syphilis ten years ago untreated but his blood and cerebrospinal fluid Wassermann tests are negative.

He comes to have a protective covering installed over the defect in his skull.

This is one of the largest cranial defects I have so far seen. Its longest diameters measure 2³/₄ by 2 inches. Almost all patients with cranial defects have some of the symptoms complained of particularly headaches and tenderness in the area involved. I have seen some with recurring nausea and vomiting which disappeared when the defect was repaired. Dizziness is a very frequent symptom. A peculiar and annoying symptom occurred in a fireman recently operated—he could feel his brain pressing to get out when he turned quickly as in going around a corner. Such symptoms have always disappeared after the defect had been repaired in my own cases. (In answer to a question) No, I would not be too optimistic about its being a cure for epilepsy if that is present. Epilepsy is often benefited by almost any operation you can notice that especially in Cincinnati. If epilepsy and cranial defect followed after a head injury I am sure it is the part of good surgery to repair the defect first before resorting to any other operation for the cure of the epilepsy.

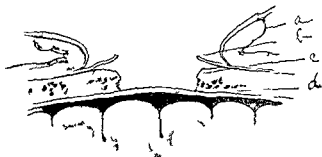
Now as to the repair of this defect. Formerly a plate of metal was placed in a skull ap or lat to be worn as a protection. The implantation of a plate of silver or gold under the scalp in order to replace the bone is a very old procedure. Later in addition to these subcutaneous vulcanite bulbs etc. have been used. Gold is the least irritating but all artificial bodies are and undesirable.

In recent years bone and plaster tiles cartilage have been used to repair these defects.

I admit that it looks most all the way like a boy defect with bone. Some insist that bone is all right to be used. I

cut thick enough and properly applied it affords a firm protecting cover for the defect and soon becomes very firmly fixed in place. I have no personal experience with suppuration in connection with its use in cranioplasty but I have had suppuration follow in one case where smaller pieces had been used on the face. The cartilage there healed in. However if a cranioplasty wound suppurated I would expect to lose such large pieces as we must use here.

The head has been entirely shaved. We now wash it with a gauze sponge soaked in ether—no brushes are used. Then a

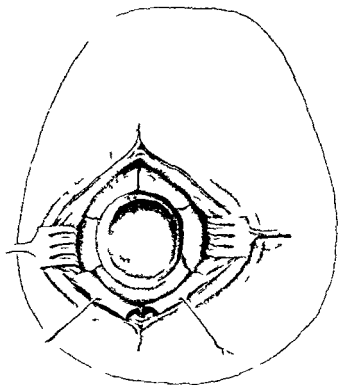


F g 644—C se t Scalp t d b k b p t m k ll d d
 sc t g b a

mixture of tincture of iodine and 95 per cent alcohol equal parts of each is painted all over the head. This is allowed to remain on for five minutes and then as much as possible of the iodine is removed by washing with alcohol. I lay stress on this preparation because with it I have secured the necessary asepsis and have never yet caused a dermatitis. It is a dangerous thing to have a dermatitis of the scalp follow an operation on the skull in which the dura may be opened.

We excise the scar cutting a little at a time and catching the vessels with Kocher or Ochsner forceps as we proceed. I

edge gained through personal experience over a long period of years. But I do know that it can remain buried in the tissues for more than five years and not diminish appreciably in volume. It does not seem to make any difference whether the perichon-



F 643—Diagram showing the head of the rib articulating with the thoracic cage. The diagram illustrates the relationship between the rib head, the costal cartilage, and the surrounding soft tissue structures.

drum is removed. In certain places I usually place the rib cartilage on the flat and all with perichondrium to maintain it. It is not to be expected that the cartilage will unite directly with the bone of the skull or all have got bone. But

the bone at the edges of the defect. The pericranium is now incised where it lies in contact with the dura or scar and it is freed from the skull back for 2 cm. from the edge of the defect. It is necessary to make a few incisions in it radiating outward from the free edge as shown in Fig. 643. Any bleeding points in the dura or scar exposed in the defect are carefully controlled either by torion or ligation. There must not be a hematoma formed in the wound after it is closed. Gauze pressure is now gently applied and held in place while the cartilage is procured.

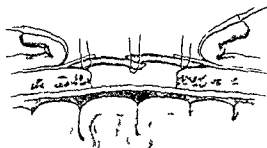


Fig. 646—C. sect. ill. t. t. g. p. t. f. t. l. g.

A glance at Fig. 648 (sketched from a skeleton) will show that there are several points where broad pieces of cartilage may be obtained. We make an incision obliquely downward and outward beginning at the fifth chondro-ternal point on the left side. The wound is about 5 inches long. The rectus is drawn inward and here are two cartilages apparently grown well together. They are removed with their perichondrium intact and without opening the pleura. I now commit this wound to the care of my assistant who will close it without drainage after making careful hemostasis.

The two cartilages you see are to all intents only a single piece. The defect is 2 inches long by $2\frac{1}{2}$ inches wide. The

have never had satisfaction with the tourniquet applied to the scalp. The bleeding, as you see, is of no moment. We now separate the scalp from the pericranium at the edge of the defect. This gives us our proper plane of cleavage for separation.

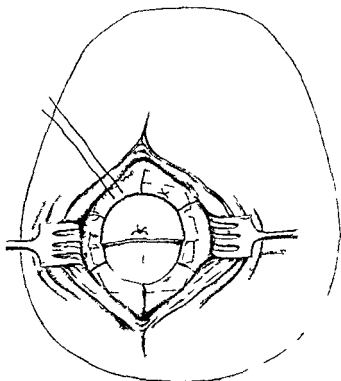


Fig. 645.—Peculiar cartilage has been placed posteriorly for pericranium.

in the scalp from the underlying bone and by the position in the defect. It is lifted up and the bleeding is cut off by the scar tissue. I am not sure that the bone is not dura. I see no need for removing the cartilage from

and through the pericranium thus their ends are covered by pericranium. The bits of bony rib left attached to the end here will soon fuse with the underlying bone.

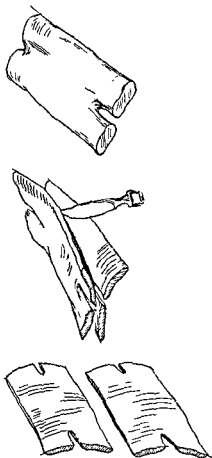


Fig. 48. Illustration of the cartilage plate.

The scalp flap will hardly close. We undercut it passing the scissor through the loose areolar layer and it is closed with interrupted silk worm gut sutures. It seems too tight. I will go well back from the medial edge and make an incision through the scalp parallel with the suture line. This opens the

cartilage removed is about 3 inches long by 1 inches wide. It will split on the flat. Notice how it curls the cut surface is convex. We now insert them into their future bed and find

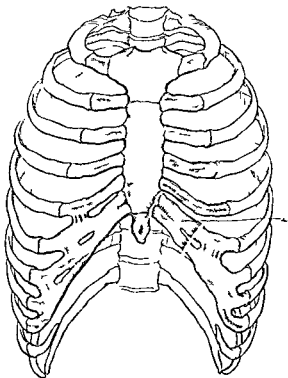


Fig 647—It is the depth of the several portions of the cartilage. The depth of the cartilage is shown by the letters b, t, a, i, d, p, e, c, f, c, a, r, t, l, a, g, e, f, d, b, l, d, h, h, c, a, r, t, l, a, g, e.

that their edges must overlap a little. The perichondrium is turned toward the bone—this fits better than they are held in place by catgut suture passed through the ends (which have been beveled at the expense of the rest of the surface).

CLINIC OF DR FRED W BAILEY

ST JOHN S HOSPITAL

GASTROTOMY FOR LARGE OPEN SAFETY PIN

Summary Congenital defect of abdominal wall Repair as described on second day Recovery Large safety pin swallowed when two years old Fixed in stomach wall Delivered without incision by rotation method

Baby St Jean —The first case presented is of unusual interest in that it is a second visit to the operating room for a baby two years old I will refer briefly to the previous operation because it seriously complicated the present one

When born (December 18 1920) the attending obstetrician Dr Percy H Swahlen found a congenital defect of the abdominal wall An ovoid area involving two thirds of the space between the ensiform and pubes was covered only by peritoneum dark in color the infant cried continuously the area bulged like a toy balloon during every exertion and rupture seemed imminent Skin fascia and muscles were entirely absent

The defect comprised so large a proportion of the abdominal wall that hope of repair seemed futile but was attempted by the following technic

Under light ether anesthesia the infolded skin margins of the entire circumference were gently separated from the peritoneum and bordered. From the upper and lower pole of the defect the skin was incised to ensiform and pubes. By blunt dissection with all pressure directed against the skin an undermining process involving the entire anterior lateral and posterior walls to the erector spina group was accomplished. This permitted a snug approximation of the skin over the defect under reasonable tension without blanching. A running suture of chromic O gut with a few tension sutures and adhesive strips

areolar layer through which we just swept our scissors and as the incision gapes the tension is removed from our suture line. We dress the wounds with iodoform gauze.

Postoperative Note—The wounds healed per primam. All sutures were out by the sixth day. On the second day the patient became drowsy. He had been given bromid. and these were discontinued. He remained drowsy for ten days and was then given salvarsan (Wassermann negative). In two days he was much better. He was given salvarsan once a week for three doses. His whole character seemed changed and he showed some return of function in the left arm and leg.

He was seen in 1921. He had not recovered the use of his left side but he had no more headache or dizziness or the fear of injury and was able to care for himself. The covering was strong and firm.

interloper. You will note the respiratory bulging is not excessive. The umbilicus was marked only by a peritoneal protrusion near the lower angle and is of course absent. The old scar is now excised. A thin fascial layer has developed

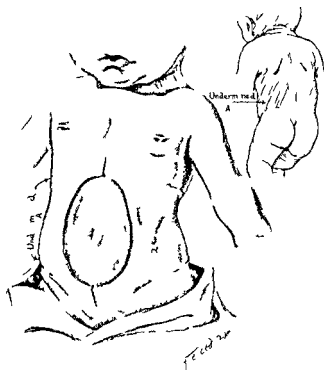


Fig 650—C g t l d f t f b l l l l Sk ma g t d
 E t b l g g l l t d f t sal f d pe t m ly
 Sh d d d t d m g f k f l d g flap H t l d t t d
 l d t l f Sk dg f d f t mf f h d

between the skin and peritoneum. No attempt will be made to separate the fascia and peritoneum and the skin dissected only far enough to accommodate a buried suture line. The present stomach fills the incision. No intraperitoneal ad

to relieve the suture line succeeded in holding until the repair was complete.

The baby lived an uneventful life for two years, developing normally. A new flannel binder was constantly worn to control the slight bulging. The protector proved to be a menace for two days ago during a period of self-entertainment the binder was lifted, a large safety pin selected and promptly swallowed.

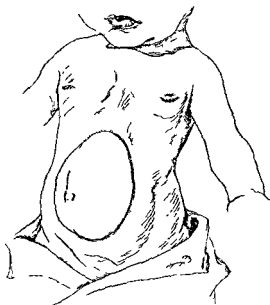


Fig. 649.—Showing the position of the foreign body.

The size of the companion pin and the fact that the swallowed pin remained in the cardiac region for such a long time influenced me to use the term "lithic" instead of "foreign body." In a similar case operated on by the author, the pin point perforated the mucosa of the stomach, but without perforating the serosa.

Operation.—The child was placed in the lithotomy position.

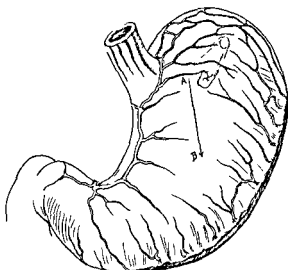


Fig 652—F t p o t f p h g p o t g a g d m s a

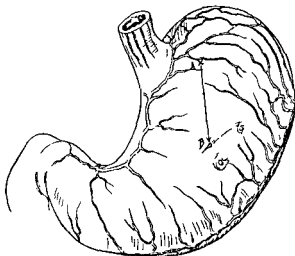


Fig 653—A O g l t f p B t t w h h d l y f t d

rotated thr u h the opening the hinge and head following the point as you will ce without tearing the serosa The thumb and

hesions are demonstrable. The stomach wall is now gently palpated bimanually between both thumb and forefingers beginning at the cardia and carried out slowly and systematically. My right hand has located the pin high in the left angle. An attempt to bring it down proves the point is buried. The point can be felt just beneath the serosa. The pin is now in

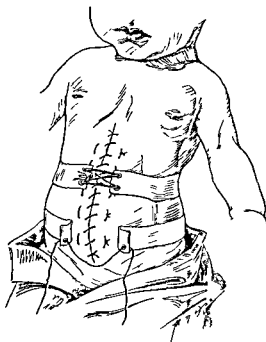
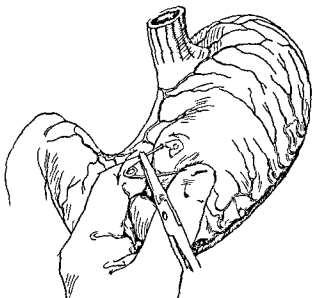


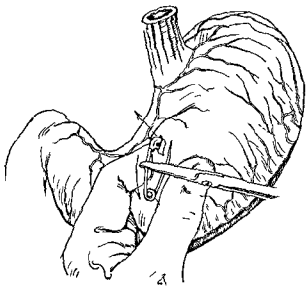
Fig. 651.—Skin flaps dissected and turned down. Cl. median. Adh.

verted and carried down by pushing the thumb walls up with the free hand necessary to release the pin.

A blood-free area on the anterior abdominal wall is selected. The pin point is forced to penetrate and is grasped by a lamp. The delivery of the pin will be difficult and an incision permitting the pin to dilate the region is necessary. By holding tightly the stomach wall at the point of insertion the pin is



F g 655 — Rot t d d l ry f lbow



Fg 656—C d t t a d d l ry f p h d th gh d l t d
 p d

fingers meantime effectually control the stomach contents. The pin is now delivered and the opening you see contracts almost to invisibility. It is grasped by an Allis clamp, one fine gut suture pierces both serosa and mucosa and is tied. A primary purse string suture invaginates the puncture and is followed by one or two more as indicated. The stomach is replaced and

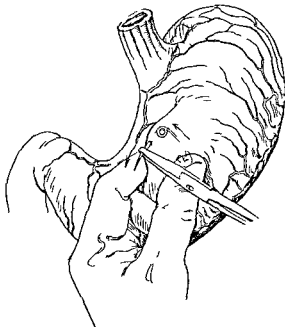


Fig. 654.—Puncture made and carried down by means usually to blood free
diposted through the diaphragm.

the peritoneum with its thin fascia sutured. The first suture is an edge-to-edge running suture of No. 0 chromic gut reinforced by a relaxing suture of No. 1 twenty days. The knot now approximated and an adhesive dressing is placed on the incision on either side applied. A flannel binder must be constantly worn containing a constrictor directed forward to overcome fatal tension on the suture line.

REPAIR OF DUODENAL PERFORATION CHOLECYSTOTOMY FOR GALL STONES

Summary Perforated duodenal ulcer complicated by gall stones with light jaundice Abscess evacuated perforation sutured gall stones removed Gall bladder not removed because of adhesions and tumor overlying common duct Common duct obstruction relieved by operation and gall bladder drainage ceased in normal period Recovery without gastro enterostomy or other procedure

Mr W H —This patient has been under medical care for several years He comes to operation with a diagnosis of gall bladder disease complicated by duodenal ulcer with possible perforation He has suffered several hemorrhages and attacks simulating imminent perforation You can see by his general appearance that he is markedly emaciated This is believed to be due to his inability to digest and assimilate his food and not to an emaciation which usually accompanies malignancy There is a palpable mass near the midline involving the space in the right subcostal angle An oblique right rectus incision is now made the rectus muscle which you see is quite attenuated is divided by blunt dissection and the peritoneum opened There are adhesions to the parietal peritoneum The margin of the liver is low and is firmly adherent to the mass underlying it mesial to the gall bladder the tip of which is exposed Before disturbing this pathology I will make an excursion of the abdomen There are no palpable tumors or glandular enlargements no abdominal adhesions except in the upper right quadrant The operation thus far has been conducted under local anesthesia The anesthetist will now administer gas oxygen to the analgesic state The patient's condition does not warrant ether anesthesia You will note that the local anesthetic has obtained complete abdominal relaxation The mass is now elevated and the adhesions gently divided in the cleavage line the gall bladder is now exposed to the common duct and contains several large

You will note the pin point stands a full inch from the head. Aside from the fact that perforation of the stomach wall was imminent it is very unlikely that the small intestine could

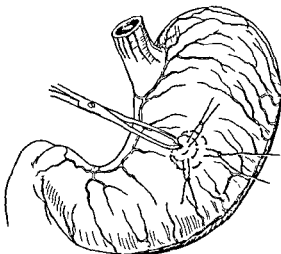


Fig. 657—Opening immediately closed and closed by through and through catgut sutured per se string

has accommodated this rude visitor to the normal exit. Note Recovery uneventful bulging of wall less than before child discharged cured within three weeks from entry

surface are now free the omentum is sutured over the site of the ulcer the gall bladder opened sponged dry and several gall stones of large size removed Free drainage of bile into the gall bladder follows this removal A gall bladder drain is now inserted and held in position by a purse string suture a cigarette drain is placed over the old abscess site and another leading from the cystic duct area the abdomen is now closed in layers the three drains lead in at a common exit The skin is now closed and the patient will be awake and able to speak to us in less than three minutes There has been a minimum amount of shock attending the operation his abscess has been relieved the perforation at least temporarily controlled and gall stones removed with a free exit for bile and the patient will be given an opportunity to sufficiently recuperate so that any future procedure which may be indicated can be carried out with safety The surgical judgment of the operator in cases of duodenal perforation must determine the magnitude of the operation Removal of the ulcer site by excision or resection is surely more ideal than the simple procedure you have just seen carried out The lowered mortality in this particular case would distinctly contraindicate at least all unnecessary operative shock It is not believed that a gastroenterostomy is necessary at this time The section taken from the ulcer area is to be examined for possible carcinoma and our further steps in this case will be guided by the laboratory findings and the patient's progress

Note—Patient made a rapid recovery and was discharged in twenty days with drainage wound entirely healed The laboratory findings were negative for malignancy Patient at this time nearly two years from the time of operation is able to attend to his work and has regained his normal strength

stones. The transverse colon, liver, gall bladder, pyloric end of the stomach and duodenum all participate in this mass. While separating the transverse colon from the liver margin an abscess has been liberated. This is quickly sponged away without contaminating the general peritoneal cavity which is also protected by flat sponges. The abscess leads to the anterior surface of the first part of the duodenum at which site an oval opening is seen

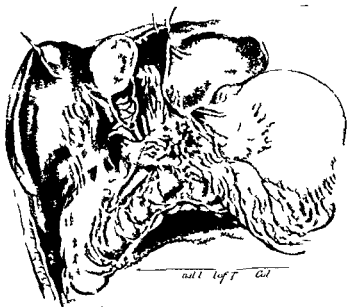


Fig. 658—Duodenum perforated completely by hill of abscess (omitted) infected gall bladder.

from which flows the duodenal content. Approximately an ounce of pus has been liberated. The duodenum is considerably thickened at the opening; no clearly defined purulent structure and infolded by transverse thickening of the duodenum but not materially contracting the lumen. You will note that one finger passes distal. Adhesions closing the second part of the duodenum completely and inferiorly.

JEJUNOSTOMY INOPERABLE CANCER OF STOMACH

Summary Abscess of lateral wall over ninth and tenth ribs proved to be result of spontaneous perforation of stomach from carcinoma of fundus Jejunostomy for relief of inanition and dehydration Death

Mr T—The history of this patient will interest you more than the operation which is to be merely exploratory with a jejunostomy under local anesthesia Before the patient is brought in a brief résumé will be given

Over two months ago he came to St John's Hospital complaining of an abscess of the left side We found a large bulging fluctuating tumor which had dissected the skin from the ribs and lateral abdominal wall It was incised under local anesthesia and about 1 pint of pus of colon bacilli odor was released The base of the abscess between the eighth and ninth ribs had the feel of granulation tissue The patient had given a history of an injury to the side several weeks previous The abscess was drained and healed within a short time About two and a half weeks afterward he reentered the hospital for the same condition the old wound having opened Under local anesthesia the sinus was enlarged and Dakin tube drain inserted About one week afterward patient stated that he felt everything taken into the stomach pass through the opening into the dressing A test was made with coffee and it appeared through the discharging sinus almost as rapidly as it was taken by mouth A section of the floor of the cavity was immediately sent to the laboratory and proved to be carcinoma

Operation—This is evidently a case of carcinoma of the stomach which has spontaneously perforated The object of the operation is to explore and to provide a method of relieving inanition temporarily by means of a jejunostomy The left rectus area is now blocked by local infiltration and the abdomen opened The parietal peritoneum over the splenic area is tightly adherent to stomach and transverse colon The margin of the

1 ACUTE OBSTRUCTION RESECTION OF GANGRENOUS LOOP 2 ILEOCOLOSTOMY

Summary Acute obstruction with abscess and gangrenous loop of ileum General peritonitis Dissection Artificial anus for three and a half weeks Intestinal continuity re established by ileocolostomy switching around terminal ileum cecum and ascending colon Recovery and return to normal state of health

Master D C—This young patient is eight years of age He entered the hospital about three weeks ago He was at that time suffering from an acute intestinal obstruction with a palpable tumor to the left of the median line below the umbilicus Several weeks ago he had been operated presumably for a pus appendix Am informed by his father that his appendix was removed and drains inserted but that it failed to drain for nearly two weeks the temperature continuing and the soreness at the site of this present tumor remaining He states that drainage began and continued at intervals and that his pain in the left side always disappeared while drainage was active This history if accurate fairly well proved that the appendix was not the original site of infection Upon his entry three weeks ago an incision was immediately made for the purpose of relieving the obstruction Four degrees of temperature and a high white count with the presence of the tumor established the existence of a peritonitis attending the obstruction Upon opening the abdomen over the tumor masses of intestinal loops and omentum were revealed In separating them an abscess was released (foul smelling) streaked with blood It was necessary to continue the exploration until the cause of obstruction was located This proved to be a 12 inch loop of ileum about 20 inches from the cecum which had undergone volvulus had become adherent and its circulation completely cut off The loop was black and was leaking its content from an opening at the apex It was immediately withdrawn and excised leaving the two well circularized lumens attached in the abdominal opening Drain

stomach leading into the abscess area is thick nodular and infiltrated. This process extends upward over the entire fundus and is obviously inoperable. The proximal loop of the jejunum is brought into the wound and a No. 20 French catheter is passed through a transverse slit and invaginated by a purse string and reinforcing Lembert sutures. Fluid will be immedi-

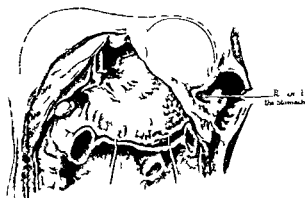
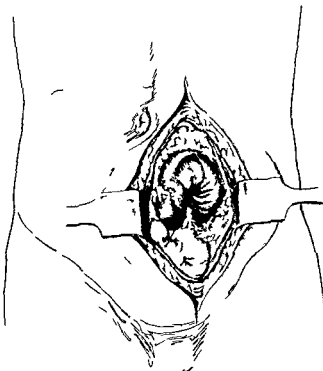


Fig. 69—Spontaneous perforation of the stomach. St. f. p. f. t. Abscess cavity. A. f. m. h. l. d.

ately given to the patient and pushed rapidly accepted. Abdominal wound is closed about the tube without drainage and an adhesive dressing similar to that used in catheterization is applied.

Note.—Patient lived but a few days. Peritonitis followed a leather bottle cancer involving the entire fundus with pontaneous perforation and bleed.

excised and the skin undermined sufficient to close without tension. The excised area included both proximal and distal openings and they are now closed by clamps which also act as retractors. After careful protective toilet of the skin margins the dissection is carried down to the peritoneum at the upper



Fg 661—L ft t —om t m t t d b ca ty
l p f g g l m l d l t t t l dh p f d
fib

angle of the wound sufficiently far from the affected area to enable us to enter without fear of further injury. Once within the peritoneal cavity the exploring finger can sweep the peritoneal adhesions free and the delivery is completed without danger. You will note the great size of the proximal gut in com

age was introduced in culdesac and both flanks and the patient put to bed given freely of soda and glucose 3 per cent each intravenously and axillary seep until immediate postoperative shock was overcome. He traveled on thin ice for several days but gradually improved and at this time less than a month the peritonitis is under control drains removed and we believe it

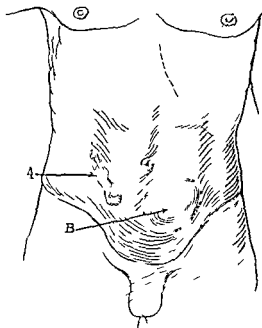


Fig 60—Case 1 M t D C A D p t g l d d g sca f l l g
p p e d t m y t h t l f f y m p m B f b l m h h
dra d t m t t l y t h r o g h l a n g l f s c a

possible to put his intestine back into normal position. He will be given gas-oxygen and the cells will be kept as rapidly as possible on account of his age and physical condition. The skin surrounding the artificial anus is carefully constricted. It will be covered by vaselin gauze strips and will heal up all if successful in removing the cause. The old undecomposed

ileum is traced to the cecum. There are numerous fibrous ad-

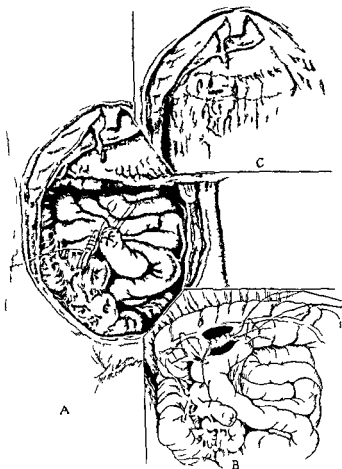


Fig 663—A Section of the ileum (f) and the cecum (c) showing the gangrenous loop (g) and the ileocolostomy (i). B Latent ileocolostomy (l) and the gangrenous loop (g). C Post-operative view (p) showing the ileocolostomy (i) and the gangrenous loop (g).

hesions which cannot be released without danger of injury to the bowel wall. The cecum itself and two thirds of the ascending

pass on to the horizontal distal section. Before determining upon our next step it is necessary to be sure that no point of ob-

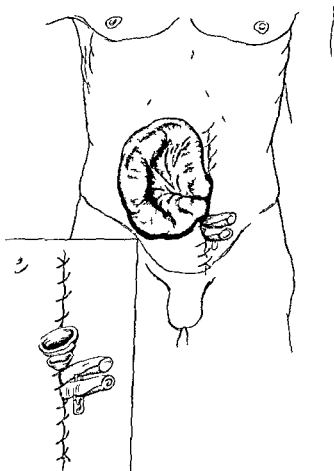


Fig. 662—(g) loop (d) d (g) b l h d l d
 (j) t d I s e r t A m p d p l d l l g

struction lie between the anastomosis and the normal intestine otherwise our work will be for naught. The collateral circulation

CLINIC OF DR BARNEY BROOKS

BARNES HOSPITAL

TWO CASES OF ANEURYSM

CASE I ANEURYSM OF THE EXTERNAL ILIAC AND FEMORAL ARTERY

THE first patient to be presented in this clinic is one who is interesting to us from several viewpoints

First Aneurysm involving this particular vessel is rare

Second Aneurysm at the particular site at which this one occurs presents the combined problems of cure of the aneurysm and safety of the extremity

Third It was for a condition simulating this condition to be shown that the treatment instituted in this case was first carried out in a brilliant operation by a resourceful surgeon who practised in this country before the days of anesthetics or asepsis

Fourth This case has been under careful observation now for a period of one year since she was operated on by us and we therefore have not only the opportunity of a discussion of diagnosis and several possible means of treatment but we shall have an opportunity of seeing the results of the method of treatment chosen at a time sufficiently remote that we may judge as to its value in this and similar cases

This patient is a woman forty four years old who first presented herself to us on May 1 1921 complaining of a lump in her right groin which had been noticed by her six years previous to the time we first saw her The lump had slowly increased in size and had during the year previous to her coming to us been associated with great pain in her right thigh and leg

From the Department of Surgery, Washington University School of Medicine

colon are involved in a mass of adhesions which appear to me likely to obstruct the lumen and can be released only with considerable difficulty and danger. It is my intention therefore to invaginate and close permanently the end of the lower loop and to anastomose the proximal ileum to the transverse colon. The mouth of the proximal ileum is invaginated by purse string of hard chromic gut reinforced by Lembert sutures. The transverse colon at the selected site and the ileum are grasped by four Allis clamps and the anastomosing clamps applied. From this point the procedure is identical with that of a gastroenterostomy chromic gut hard is used throughout and a rapid union with a large lumen effected. The end of the ileum is directed to the left so that the cecal current may not be discharged. The anastomosis is now completed and the protecting posterior suture carried around the entire circumference of the inverting continuous mattress. The abdomen is closed without drainage and vaselin gauze applied over the denuded area. Note. This patient made a slow but steady recovery and was discharged from the hospital cured about seven weeks following the last operation. His appetite is excellent and purgatives are not required.

The 4 cases reported above selected from various clinic day off but light opportunity of demonstrating any unusual technique. They were selected because they presented conditions and pathology somewhat unusual in character and demanded a conservative form of radical surgery.

The prime object of surgery is to relieve distress and at the same time conserve life. A finished technique must often be sacrificed for the sake of expediency. By careful preparation for operation combating shock before it has a chance to develop instituting two or more stages if advisable in serious cases and by zealous postoperative supervision many cases that are borderline in the beginning can be graduated into safe risk class and finally result in success.

years whose general examination other than that associated with the lesion under discussion was that of a well woman. In the right groin was a large visible tumor (Figs 664-665). The

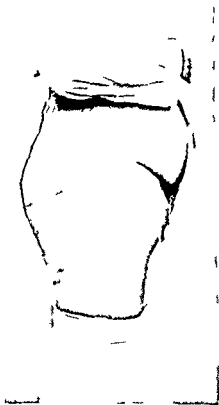


Fig 664—Photograph of the right groin showing a large, dark, irregularly shaped tumor.

tumor occupied all of the space of Scarpa's triangle and could be felt to extend above the level of Poupart's ligament. There was a visible and palpable expansile pulsation in the tumor. On

She was a seamstress by profession. She had been forced to abandon her means of livelihood and indeed had spent most of the six months previous to her first visit to us in bed on account of the severe pain associated with the tumor in her groin.



Fig 664.—Photograph of Case I, showing position of the tumor.

She was admitted to the Barns Hospital on May 4, 1921. On examination at this time the following findings were noted: The patient was a well-nourished woman, 45 years of age, with

STUDENT It can be done only by an exploratory operation

DR BROOKS I think it can be said with almost certainty that any aneurysm which has developed spontaneously and slowly is a true aneurysm What other sorts of aneurysm may be differentiated?

STUDENT Fusiform aneurysm and saccular aneurysm

DR BROOKS Which sort is this most likely to be?

STUDENT I think it may be a saccular aneurysm from the manner which it presents itself externally

DR BROOKS No I do not think this aneurysm is of the saccular type It extends a considerable distance along the course of the artery It has no to and fro murmur which is likely to be associated with a sac communicating with the artery by a defect in only one wall of the vessel and a true saccular aneurysm is very rarely spontaneously developed particularly at any other site than in the heart or aortic arch

Having now arrived at the conclusion that this was a fusiform aneurysm of the distal portion of the external iliac and proximal portion of the femoral artery we may visualize the anatomic pathology and begin the consideration of the possibilities of relieving the disease by surgical measures It can readily be seen that this aneurysm occupies what may be called a most dangerous portion of the arterial supply of the lower extremity for obliteration May I ask why this statement is made?

STUDENT Because it is located at a site which makes the control of hemorrhage extremely difficult

DR BROOKS Yes this is true But the point I had in mind is this In dealing with this condition two problems are up to be solved and it so happens that a complete solution of either one excludes a complete solution of the other Problem one is the cure of the aneurysm Problem two is the safety of the extremity from gangrene The only way we can feel sure of completely curing the aneurysm is the complete obliteration of the entire aneurysm sac If this is done it is very likely that the first portions of the profunda and deep epigastric arteries will be occluded and this would block the chief avenues of collateral

auscultation there was a loud systolic bruit which could be heard over the tumor and along the course of the femoral artery in Hunter's canal. The veins of the leg and thigh were somewhat distended and there was marked edema of the right leg. There was anesthesia corresponding to the distribution of the femoral nerve. There was however no continuous humming bruit to be heard over the tumor. That the tumor was an aneurysm was proved by the fact that the tumor occupied the position of a large artery; it had an expansile pulsation and there was a loud blowing murmur.

DR. BROOKS: What sorts of aneurysmal tumors are there?

STUDENT: Aneurysms involving the artery alone and aneurysms in which there is a fistula between the artery and vein.

DR. BROOKS: What particular characteristic was present in this case which made it unlikely that this was an arteriovenous aneurysm?

STUDENT: The fact that there has been no penetration around

DR. BROOKS: The absence of a history of penetrating wound, the fact that there was not a continuous humming murmur heard and the absence of a positive venous pulse in the veins of the neck made it certain that we were not dealing with an arteriovenous fistula. The continuous humming murmur so loud as to be heard without a stethoscope, on putting the ear against the patient which is almost always associated with very distinct palpable thrill is almost pathognomonic of an arteriovenous fistula. In a case of a tumor similar to this one the presence of a communication between the artery and vein is apparent beyond all question of doubt by the demonstration of positive wave in the venous pulse taken from the neck veins. This was well produced by the systolic rush forced into the femoral vein which entered a large vein in the neck, into the vein of the neck.

Having thus ruled out the possibility that this might be an arteriovenous aneurysm, the other differential diagnosis is

STUDENT: It should be determined whether this is an aneurysm, a false or true one.

DR. BROOKS: How may this be determined?

pected to preserve the vitality of the extremity that we would be forced to adopt some method which would preserve the whole or part of the aneurysm as a channel for blood to flow through. Now what method offers this possibility?

STUDENT The Matas operation

DR BROOKS Yes theoretically the Matas operation in which the aneurysm sac is opened and imbricated in such a manner as to preserve a channel through the site of the aneurysm theoretically accomplishes this result. We feel however that practically this channel so frequently becomes obliterated by thrombus formation that it is an unwise surgical procedure.

STUDENT Why is it unwise? It would seem that if the channel remained open all would be well while if it became thrombosed nothing could be lost.

DR BROOKS The thrombosis of an artery is always attended by a much greater risk of gangrene than a ligation of the vessel because a thrombus once started in an artery often obliterates the vessel for a long distance and even more important still the thrombus often extends out into the branches of the vessel and thus blocks the collateral circulation as well as the primary artery.

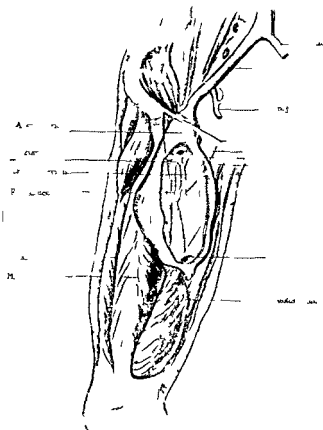
We therefore felt that in this case we were forced to accept one of two methods and I may add that the carrying out of either method practically committed us to stick to the method chosen because once one was used the other became useless or dangerous.

(1) The first method could consist in obliterating the aneurysm sac and taking the risk of losing the leg from gangrene.

(2) The second method could consist in an attempt to keep the aneurysm sac and reduce the pulse pressure of the stream of blood flowing through it to such a point as to inhibit the further growth of the aneurysm but not to reduce the flow so much as to cause gangrene of the extremity.

The second method was chosen in this case. In other words we believed it was probably better to have some aneurysm and a leg than no aneurysm and no leg. Anybody can cure an aneurysm if it can be exposed but the cure of the aneurysm

circulation (F 666) I think the danger of losing the le by



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extremity but it seemed as if we had good reason to believe this decrease in volume flow would not be sufficient to result in gangrene or serious anemia

With this idea therefore on May 10 1921 we opened the patient's abdomen and ligated the right common iliac artery. The ligature was placed half way between the bifurcation of the aorta and the origin of the hypogastric artery

The result of this operation was that immediately on tying the ligature pulsations in the aneurysmal tumor apparently completely ceased. By the time however the abdomen was closed a faint pulsation in the aneurysm could be made out. The sac was much less tense. During the next forty eight hours the pulsation became slightly more marked but was very much less than before operation. At the present time thirteen months after the operation you can see and feel pulsation in the aneurysm. I cannot see that it has increased beyond what it was a few days after operation. Since operation the aneurysmal tumor has decreased in size the girth of the thigh over the tumor being now 10 cm less than before operation. The pain was immediately relieved and has not recurred. Also the edema of the leg disappeared and has not returned. The anesthesia of the areas supplied by the femoral nerve has recovered. We may now say the patient has an aneurysm. It is not increasing in size. In fact it is growing smaller. It is not painful. Finally most important of all she has a good functioning lower extremity. There are however certain signs and symptoms of decreased circulation in this extremity.

What is meant by the term ischemia or ischemic?

STUDENT Ischemia means without blood for example Volkmann's ischemic paralysis is a condition in which there is a muscular paralysis due to lack of arterial blood.

DR. BROOKS Your answer I believe is in accord with the usual idea but ischemia does not mean without blood. It is derived from two Greek words meaning to stop blood. This distinction from anemia should be clearly kept in mind. Volkmann's ischemic paralysis is not a paralysis due to lack of arterial blood but is an acute myositis due to an acute venous

without endangering the extremity is a task requiring more than mere surgical dexterity.

What method have been used to restrict the blood flow through an aneurysm sac?

STUDENT: Digital compression.

DR. BROOKS: Digital compression of the vessel proximal to the aneurysm is the oldest method of treatment of aneurysm. But the idea of this method is the temporary stoppage of blood flow in the aneurysm and obliteration of the sac by the clotting of the blood in the sac. It is sometimes successful but unfortunately cure of aneurysm by this method is uncertain and the risk of gangrene is greater than with other methods. I had in mind particularly the method introduced by Halsted in which constrictor bands were applied to the vessel proximal to the aneurysm. I believe Halsted's method was particularly aimed at the so-called development of collateral circulation a principle about which I am somewhat skeptical. Halsted however made another contribution to our knowledge which is of great use to us in the treatment of this patient. In the Johns Hopkins Hospital Bulletin of 1913 he showed by careful study of all the recorded cases of ligation of the common iliac artery that this procedure was not to be looked upon as one seriously endangering the life to gangrene. With this knowledge we tried two years ago ligation of the common iliac artery preliminary to hip-joint amputation and in 3 cases in which I did amputation through the hip-joint we had an opportunity of observing the bleeding from the great vessels in the thigh after complete occlusion of the common iliac artery. In the case the large arteries bled freely when pinned. The bleeding however was in a stream that was completely arrested. The pressure in the vessel was surprisingly high but the diastolic and systolic pressures were not altogether. If therefore occlusion of the common iliac artery leads to marked diminution in the pulse passing in the femoral artery, I felt that such a condition might be of little benefit if not cure an aneurysm of the femoral artery. It goes without saying that this diminution in pulse pressure will be expected to decrease the efficiency of the collateral circulation.

principle which I feel is too often forgotten in surgery. No surgical procedure should be undertaken by anyone who is not prepared to visualize his patient clear through to the end. Never become so much interested in an aneurysm that you forget the extremity, nor so much concerned with the extremity that you forget the patient.

CASE II ANEURYSM OF THE ARTERY COMMUNICATING THE PLANTAR AND DORSALIS PEDIS ARTERIES

The second case to be presented is interesting, particularly from two viewpoints:

(1) It is an extremely rare if indeed not a unique case.

(2) The problem of treatment is entirely different from the case already presented.

This patient is a man sixty-eight years old who comes to us for relief of a painful tumor on the dorsum of the left foot. The past history of this patient is of no importance concerning the present illness except that there is a complete absence of any evidence of venereal disease. Two years ago a heavy wagon wheel passed over the left foot. The patient states that immediately after the injury a swelling was noted on the dorsum of the left foot and that this swelling has as far as he can determine not changed in external appearance to the present day. Several times the patient has noticed that the swelling became hard for a few days but it has always become soft again. During the past few months there has been some pain. The main cause however for seeking relief is the actual mechanical interference with function on account of the mass of the growth.

On inspection you will note the presence of a large tumor on the dorsum of the left foot over the distal ends of the metatarsals (Fig. 667).

DR. BROOKS: Examine this tumor and enumerate its most significant characteristics.

STUDENT: (1) There are no visible changes in the skin overlying the tumor. (2) There is no tenderness. (3) The tumor pulsates with definite capillary pulsations. (4) There is no palpable thrill. (5) There is no murmur to be heard.

obstruction. The arterial blood flow must be good for the condition to develop. This patient however shows very well indeed a condition which I believe is correctly termed ischemia. She has no paralysis. In fact she has no symptoms when she is at rest. When she has walked for a considerable distance (five to six city blocks) she states that the leg becomes heavy and that she has cramping pains in her right calf. This condition is worse in winter than in summer. As you feel of her legs you will note that the right leg is always cooler than the left. This condition can be very easily reproduced any time by ligation of the abdominal aorta of a dog. After such an operation the animal seems perfectly normal as long as he does not exert himself but after running even a short distance his hind legs become completely useless. They recover after a short rest. This condition is the result of a circulation which is sufficient for preservation of vitality but is incompetent to remove the waste products of active muscle exertion. It is a phenomenon of fatigue. It is exactly the phenomenon you have all reproduced in the physiologic laboratory with the nerve muscle preparation.

There is just one other point I wish to make. This is one which I believe is known to physiologists but I do not believe clinicians have appreciated it as yet.

If you will feel of this aneurysmal tumor you will note it is tense but that it pulsates little. This means that the pressure of the blood in the vessels distal to the aneurysm is not greatly reduced from normal. But the fact that pulsation is very small means that there is little change in the pressure during each cardiac cycle. In other words the diastolic and systolic pressures are nearly the same. The pulse pressure is small. Circulation or volume flow of blood through tissue depends on pulse pressure. We have found experimentally that the extremity of a dog may actually become gangrenous with an intrarterial pressure only approximating normal. In such case the diastolic pressure is increased until it limits the diastolic pressure.

This is the first time I have observed it.

transmit the pulsation of a tumor from transmitted pulsation by a tumor from an underlying pulsating vessel

Furthermore there are two facts which are against this tumor being an aneurysm. First It is in a site at which aneurysm has not to my knowledge been previously observed. Second It is very difficult to think of an aneurysm of this size and this amount of pulsation without a thrill or a murmur.

In spite of these facts which are it seems to me very strongly against aneurysm I shall bring out a previous observation which beyond all question of doubt proves this to be an aneurysm or at least a tumor composed of large blood spaces.

DR BROOKS TO STUDENT (A) Find the posterior tibial artery with your right hand and the dorsalis pedis artery with your left hand.

DR BROOKS TO STUDENT (B) I palpate the tumor and tell us what changes you will note.

DR BROOKS TO STUDENT (A) Compress the dorsalis pedis artery.

STUDENT (B) The pulsation in the tumor is decreased but still present.

DR BROOKS TO STUDENT (A) Keep the pressure on the dorsalis pedis artery and compress the posterior tibial artery.

STUDENT (B) The pulsation in the tumor has completely stopped and the tumor is not so hard.

DR BROOKS TO STUDENT (B) With the palm of the hand exert pressure on the tumor.

DR BROOKS You will note that pressure on the tumor is causing it to become smaller. As the pressure is continued the tumor completely collapses.

DR BROOKS TO STUDENT (B) Now remove all pressure from the tumor.

DR BROOKS You now see in place of the tense pulsating protruding tumor a depression with the characteristics of a collapsed bubble (Fig 668). Now if the pressure on either or both anterior and posterior tibial arteries is removed the tumor resumes its original characteristics. You will note that the tumor fills slowly and with a stethoscope over the tumor you can hear

DR BROOKS With the characteristics enumerate the possibilities of the nature of this tumor

STUDENT (1) Aneurysm () a very vascular neoplasm

DR BROOKS Assuming the condition here an aneurysm or a very vascular new growth that evidences a case there for and against each of the possibilities?



Fig 66 — Photograph of Case II showing popliteal aneurysm

STUDENT I think it an aneurysm because the pulsation is of the expansile type

DR BROOKS The pulsation in an aneurysm is of the expansile type but is the pulsation a very vascular tumor of the expansile type pulsation in all direct of the characteristic of an aneurysm It is characteristic of any tumor in which the pulsation is then the tumor and vessels

considered a terminal aneurysm. The fact that it developed immediately after an injury makes it almost certain that this

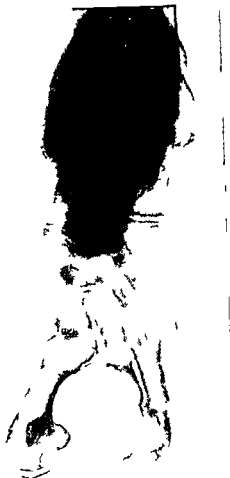


Fig. 669 — Ray photograph of the body of the foot of Case II showing the separation of the first and second metatarsal bones.

aneurysm is a false aneurysm; i. e. that the aneurysmal sac is not derived from the vessel but is developed by the tissues

a blowing murmur with each pulse wave while the tumor is filling.

This examination proves that this mass is composed of a cavity in direct communication with both anterior and posterior tibial vessels. The vessel which is most likely involved therefore is the branch of the dorsalis pedis artery which passes be-



Fig 668—Drawing of the head of a horse showing the position of the tumor on the dorsalis pedis artery.

tween the first and second metatarsals to connect with the plantar artery to complete the plantar arch. That this artery is the one involved is also made most likely by the x-ray photograph of the foot (Fig 669) which shows the enlargement and erosion of the first and second metatarsal bones.

This aneurysm seems to me unique in that it may be

completely occluded without interfering with any nutrient vessel. In fact is it not a matter of some considerable interest to wonder how it is that the arterial arches of the hand and feet persist under normal condition for there must always be some point in the arch at which there is no flow of blood.

With these facts therefore in mind the treatment of this aneurysm becomes merely a problem of complete obliteration of the aneurysm to which may be added without fear of a disturbance in circulation the complete obliteration of the vessel from which the aneurysm is derived.

In conclusion it would seem a matter of considerable interest to think how it is this aneurysm has not undergone spontaneous cure. The blood in all probability does not circulate through the sac. It merely passes in and out through the same opening. From our observations on the emptying of the sac and allowing it to refill it would seem that the opening communicating between artery and aneurysm must be rather small. If these conclusions are correct then the blood in this sac must be similar to back water from a flowing river. One would expect under such conditions the clotting of the blood and the organization of the clot and the spontaneous cure of the aneurysm. From the history we have definite evidence of the sac having been several times hard but strange to say the clotting in the sac at these times failed to obliterate the aneurysm permanently.

Note—This patient was subsequently operated and the condition found is shown in Fig 670. The aneurysm sac was formed by fibrous tissue and the eroded metatarsal bones. The sac communicated with the artery through a small hole. The artery was ligated on each side of the hole and the fibrous wall of the sac was excised. No other openings in the sac were present. The patient made an uneventful recovery and there was no evidence of any circulatory disturbance following operation.

surrounding the open wound in the vessel. Such aneurysm sacs have no branches arising from the wall of the aneurysm. Furthermore the artery from which this aneurysm arises has no branches as it is merely a communication channel.



Fig 60—D g ll ing h f d g pe f C se ll

It is therefore true in this case that the aneurysm is not a useful part of the circulation. The blood which passes into the sac does not pass on through to supply some other part of the blood. Furthermore the artery from which it arises is merely a

CONTRIBUTION BY DR ROLAND HILL

BETHESDA HOSPITAL

CONGENITAL PYLORIC STENOSIS

CONGENITAL pyloric stenosis is a condition found in early infancy. The occurrence of this condition is not uncommon being present in approximately 1 in 200 babies as we have noted at the Bethesda Hospital and Foundling Home. It is characterized by persistent vomiting, constipation, wasting, marked visible peristalsis, and frequently there is a palpable tumor present. The nature of the causative factor in this condition is a very mooted question. Different theories have been advanced. Scudder, Downes,² Richter, Holt,⁴ Stiles, and many others with a wide and varied experience have written exhaustively upon the subject.

It has been shown that the lesion in hypertrophic pyloric stenosis is a hyperplasia of the unstriated muscle cells of the circular layer while connective tissue is not increased. The serosa and mucosa are not involved except as affected by the hypertrophied muscle. Whether the hyperplasia of the circular band of smooth muscles of the pylorus is a congenital anomaly or whether the enlargement of this muscular band is a hypertrophy resulting from hyperactivity seems as yet undecided.

There are at least two different classes of cases referred to under the same name. One simple spasm of the pylorus associated with some hypertrophy of the pyloric ring, the other in which the spasm and hypertrophy are associated with a true hyperplasia of the circular muscle fibers of the pylorus and other cases varying in all degrees between these two.

By some the condition is considered a primary hypertrophy with a secondary psychogenic element added. By others as a

vated. The vomiting is distinctly projectile. The propulsive force is at times so great that a child lying on its side may eject the contents of the stomach for a distance of several feet. Vomiting does not always occur immediately after taking food but in the later stages of a severe case a part or all of the food is ejected after each feeding. There is no fever unless complications arise such as a late enteritis. The child loses weight rapidly. Constipation is most marked and in severe cases may be practically absolute. Mucus alone may be in the stools. The urine is scanty and dark in color. The face becomes wrinkled, the tongue and mouth dry, and the child is in a condition of marasmus. The upper part of the abdomen will be found on inspection to be somewhat enlarged, the lower part narrow and empty. At times the outline of the stomach may be seen reaching to the umbilicus. The waves of gastric peristalsis soon appear and are pathognomonic. The waves are due to the contraction of the gastric muscle. They show as a rounded eminence arising at the left costochondral border where it remains for a short time, then the wave passes across the abdomen and disappears on the right side. Occasionally multiple waves may be seen at one time. They are rarely more than 1 inch in height. These waves usually occur after food is taken.

The pyloric tumor can usually be palpated in this disease. It occurs as a smooth rounded mass about the size of the end of the thumb lying at the site of the pylorus. The symptoms mentioned together with the presence of the tumor make the diagnosis positive. Occasionally a coexisting enteritis may tend to obscure the diagnosis. In one of my cases a meningitis resulting from an abscess in the ear proved to be very confusing. As an aid to diagnosis the use of the stomach tube a couple of hours after taking food is of great value. At times all the feeding may be recovered.

Diagnosis.—The diagnosis is very clear in a well marked case. The points that may be especially emphasized are (1) Vomiting. This eventually becomes projectile and in a severe case practically nothing is retained. If the case is one in which

purely spasmodic condition from gastric or duodenal irritation. By still others the spasmodic condition is regarded as primary with the hypertrophy developing subsequently.

In reviewing the cases of 54 infants which I have operated upon for symptoms justifying a diagnosis of pyloric hypertrophic stenosis it is noted that there have been two distinct types of cases. (A) Those having an early onset of the symptoms with an average age of seven weeks in which the marked tumefaction and true hyperplasia were present. (B) Those showing symptoms and signs of stenosis with the exception of a palpable tumor. In these no real hyperplasia existed. However there was a noticeable hypertrophy present and after incision of the smooth muscle sphincter of the pylorus prompt recovery without recurrence of symptoms was the rule.

Holt mentions the multiplicity of names for this condition and it would seem that there are two conditions with the same group of symptoms, those of the one type being due to a true hyperplasia and the second or smaller group caused by hyperplasticity or pyloric spasm.

Sixty one per cent of my cases were of the former group and 39 per cent of the latter type. In those cases in which the obstruction seemed to be due to pyloric spasm the early delayed onset of symptoms and the loss of eight or less rapid due to the fact that some chyme passes through the pylorus. These are the cases that respond most readily to medical treatment — i.e. tube feeding and gastric lavage. It is my opinion that a true hypertrophy however slight is the underlying factor in every case. Taken collectively as to sex these cases were 32 per cent female and 68 per cent male. The youngest child was five days old the oldest eight months. The onset of this condition is rather sudden the child may be perfectly normal and become suddenly ill in a very short time.

Symptoms — The manifestation of this illness may be manifested and further indicated by vomiting consisting of bile waves of gastric contents and palpable tumor. The first symptom that attracts attention is vomiting. This may be slight at the onset but soon becomes decidedly g

Downes and others place the mortality of this condition under medical treatment at from 10 to 50 per cent while the mortality by operative procedure in selected cases is a fraction under 2 per cent. Certainly when a child is losing rapidly operation should not be delayed.

Operation—In the well marked cases surgical treatment alone offers a probability of relief or cure and for this pylorotomy gastro enterostomy pyloroplasty and pylorodiosis have been performed in different cases.

Pylorotomy is an unnecessarily severe procedure and not to be recommended.

Pylorodiosis or stretching the pylorus or Loreta's operation has been used with fair immediate results but cases are recorded where subsequent gastro enterotomy was necessary.

Pyloroplasty has been extensively practised by Nicoll. He made a V incision through the serous and muscular coats closing this as a Y with a single row of sutures. In later cases he cut through all the coats closing with two rows of sutures with good results.

Gastro enterostomy as the operation of choice by most surgeons up to within quite recent years. The mortality is rather high but as many of the cases are almost moribund at the time of the operation it can hardly be blamed for fatalities.

Formerly I did gastro enterostomy. The babies who were brought in early were in fairly good shape and recovered. Then more cases were being brought in many of whom were practically dead and quite a number. I did 14 of these operations with only 6 recoveries.

One child a premature baby weighed 3 pounds and 15 ounces upon which I did a gastro enterostomy. The baby recovered and is well today although nine years have passed.

At the present time I am doing the Rammstedt operation exclusively having used this method in 40 cases with only 4 deaths—a mortality of only 10 per cent in cases varying in severity from the ones of short duration and in good general condition to those with well developed symptoms of enteritis. There is no death in any uncomplicated case.

the vomiting is delayed by the insertion of a stomach tube one may recover the entire feeding after two hours have passed (?) The gastric waves that pass from the cardiac to the pyloric part of the stomach are characteristic (3) The presence of tumor This can often be distinctly felt just below the margin of the rib on the right side In 60 per cent of the cases which disclosed the true hyperplasia of the circular muscle fibers of the pylorus tumor was palpable before the operation In 40 per cent having more or less distinct tumefaction revealed at operation the tumor was not previously palpable

Downes suggests that just before the abdomen is palpated the stomach should be emptied of gas by passing a small catheter and that the abdominal muscles be relaxed by allowing the baby to suck after from a bottle during the manipulation Or if necessary give a few whiffs of chloroform or ethyl chloride to secure the necessary relaxation Certainly the finding of the tumor is one of the most significant points in establishing a diagnosis of the true hyperplastic type

The use of the fluoroscope is very seldom resorted to and as a rule the diagnosis is easily possible without its aid

Treatment—Holt states that if a patient is observed from the onset of the symptoms or if a reliable history can be obtained as to the duration of the symptoms medical treatment is justified for a period of from one to ten days provided the baby does not lose more than 20 per cent of its body weight during this time If at the end of this period the weight has become stationary and there is a general improvement in the other symptoms this form of treatment may be continued always bearing in mind however that even though the infant seems to be making satisfactory progress there may be a sudden relapse If so the case should then be considered surgical and operation advised If on the other hand there is improvement under medical care or if the improvement is unsatisfactory in that the baby subsides one day and vomits the next so that at the end of from a week to ten days the infant is total; that the baby is worse than the average of the normal group and immediate peritonitis is indicated

which I experienced in one case. There is particular danger of tearing through the duodenum which is very thin in these infants. The stomach itself is usually dilated and the musculature near the pylorus hypertrophied.

The circular muscle layer of the pylorus may be found hypertrophied from two to six times the normal thickness. On separating this band the mucosa is found puckered into a series of folds and can be stretched with the fingers pressing apart from either side of the incision. The tendency is not to stretch the pylorus sufficiently and not to make the incision of sufficient length. I have had to reopen one of my cases on this account. In doing this a second incision was made alongside the original wound and the child recovered without further trouble.

A point which I have never seen described is that of whipping over the cut ends of the muscular band separately with a running suture of very fine catgut. This obviates the danger of hemorrhage from the pylorus which has been quoted as the cause of a fatal result in 3 instances in the literature on this subject. There have been no deaths in my series due to hemorrhage and I attribute this fact to the observance of this precaution.

The serosa is not sutured neither do I mattress a tag of omentum over the raw surface although in one case obstructive symptoms developed on the sixth postoperative day and the abdomen was reopened and peritoneal adhesions were found. These were released and the child recovered. The abdomen is closed in layers.

Wallstein recently reported the results in 25 postmortem examinations of cases which have been affected with this condition but several died from other cause. In 23 of these cases this operation had been done. 2 cases died before operation. The ages ranged from four weeks to two years. In her report Wallstein says that the stomachs with hypertrophied pylorus when observed soon after operation were dilated and often twice the size of a normal stomach of the same age. The thickening of the pylorus was due to an increase in the width of the circular muscle coat the other layers showing no change.

In 1912 Rammstedt reported the successful application in 2 cases of partial plastic operation on the pylorus without opening the mucosa. The serosa and the thick muscular ring were incised without disturbing the mucosa. The muscular ring was found closely contracted, bloodless and when divided gaped at once sufficient to correct the tendency to stenosis, thus widening the lumen sufficiently for the desired purpose. To make sure of this, however, Rammstedt sutured the incision in the first case drawing the lips transversely and suturing a wisp of omentum over the whole to protect the line of suture beneath. The child vomited occasionally afterwards and was a long time convalescing.

In the other case he refrained from the transverse suture, being convinced that the slitting of the muscular ring answers the purpose fully.

If the slit pylorus is left a little incontinent this can be regarded as an advantage rather than the reverse. The second infant was completely relieved of all disturbances and never vomited after the operation but rapidly recuperated under appropriate dieting.

In doing the Rammstedt operation I make an incision approximately 1 to 2 inches in length through the right rectus beginning 1 inch below the rib margin. A finger is introduced through the opening and the pyloric mass is easily exposed, slipping out from the stomach. I have had difficulty in exposing the mass in only 2 or 3 cases due to the presence of adentitious bands or adhesions.

The tumor when exposed may be found to vary in diameter from the tip of the little finger to the size of the ball of the thumb.

A longitudinal incision made through the serosa beginning well down to the duodenum and extending over the pylorus and all up on the stomach, the hypertrophied lamellated fibrous band is incised partly though not completely separated completely by blunt dissection. The latter step is very easily accomplished and is very important safeguard against the danger of fluctuating the mucosa and cutting

depending more or less upon the condition of the child before operation

Hemorrhage and peritonitis are risks to be reckoned with. The former is practically obliterated by suturing over the cut end of the circular band of muscle the latter by due care in approaching the mucous layer by blunt dissection.

We do not favor local anesthesia and consider ether the anesthesia of choice.

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After the operation of incising this hypertrophied muscular band healing is brought about by the cells of the serosa and submucosa but the unstripped muscle cells take no part in the process as evidenced by the absence of division among the cells. The raw cut muscle edges and the exposed layer of submucosa which protrudes into the gap between them become covered by a thin layer of delicate granulation tissue. By the contraction of this layer of fibrous connective tissue and the relaxation of the unstripped muscle the edges of the wound are gradually brought into contact and the pylorus relaxes. In from nine to thirteen days after operation the wound has completely healed though the site of the operation still shows a very evident depression. In twenty-five days this depression has become less and in six weeks only a delicate scar remains. In sixteen months a very thin linear scar is present. In two years the scar is scarcely visible and the stomach is quite normal. In contrast to the gastro-enterostomy this operation cures the pyloric lesion.

Postoperative Care—Most of my cases of pyloric stenosis have been operated on at the Bethesda Hospital where I have had the co-operation of nurses trained in handling young babies. This has been a very great aid in after treatment.

These children should be fed on mother's milk as they do so very much better than with some of the prepared foods or modified milk. The improvement after operation is very rapid and a child today that is crying and omitting all nourishment that is the picture of marasmus may within a week present a condition of rapid convalescence and contentment.

We saved one very sick baby by injection of glucose solution into the superior longitudinal sinus. We have found this to be of value in some of these very bad cases.

The postoperative vomiting can be greatly lessened by giving small feedings frequently, a thin duodenum atrophied in the case from disuse and is not accustomed to receiving much chyme at a time and it must be gradually trained to this after operation. For this reason and the injury from nutrition it is best not to defer the operation too long.

The postoperative shock is less than might be expected

CLINIC OF DR. GEORGE GELLHORN

BARNARD FREE SKIN AND CANCER HOSPITAL

HYSTEROMYOMECTOMY OPERATION FOR UMBILICAL HERNIA SPINAL ANESTHESIA

THE great distention of the abdomen in the patient before you (Fig 671) is due to a gigantic fibroid which is complicated by a large umbilical hernia. The indication for operation is clear but the patient has a loud murmur at the apex a systolic blood pressure of 154 and albumin and casts in her urine. From the nature of the case the operation is bound to be very extensive and the question arises whether we can conscientiously subject to a prolonged ether narcosis a person whose vital organs are impaired without incurring an almost prohibitive surgical risk. Fortunately we may resort to spinal anesthesia which in cases of this kind is far preferable to inhalation narcosis as it puts no extra strain on heart lungs or kidneys and yet permits the painless removal of even the largest abdominal tumors.

The technic of spinal anesthesia is not very difficult to acquire but demands attention to the minutest details for reasons which will be mentioned presently. The instrumentarium (Fig 672) consists of a syringe of 10 c.c. capacity and a lumbar puncture needle with not too pointed a tip. These have been sterilized and before use are rinsed out with sterile distilled water from the small bottle. The substances used for spinal anesthesia are stovain novocain and tropococain. I prefer novocain which is marketed in tablets each containing novocain 0.05 gr. and suprarenin 0.00083 gr. One tablet dissolved in 1 c.c. of water gives a 1 per cent solution 3 c.c. of this solution are needed. In order to allow for evaporation and wastage four tablets are put in 4 c.c. of distilled water in this

ceived an hour ago. She folds her arms across her chest and bends her head forward the legs are kept straight on the table

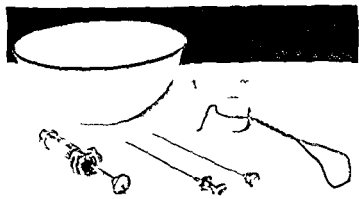


Fig 62—Stiletty th mple t f p l th Th
m ll b l ta t l d t l d t N t th po l d h wh h
th ca sol t bold



Fig 673—l th p t th d m lty f l e t g th aa t t f r p l
th f g l y l t d

(F 613) We remove the sterile covering from the back which has previously been cleansed. The injection is to be

little porcelain dish (Fig. 6/2) which has previously been sterilized and the water is brought to the boiling point over an alcohol lamp. If boiled too long the solution becomes reddish and is apt to be less efficacious. In very strong individuals I use a trifle more than 3 c c.



Fig. 6/1—The arm of the patient is held up against the operating table. She has a good night's sleep and feels rather happy and different because of the hypodermic injection of morphine.

Mean while the patient has been asked to sit up against the operating table. She has a good night's sleep and feels rather happy and different because of the hypodermic injection of morphine.

veins until it meets with a second more elastic resistance the wall of the arachnoidal sac. The stylet is now withdrawn the needle is very cautiously moved inward and perforates the wall of the arachnoidal sac without difficulty (Fig 675)

Let us recall for a moment the topography of the lumbar spine. The solid termination of the spinal cord lies at the lower border of the first lumbar vertebra in women and children usually a little lower down. From this solid end there spring two bundles of nerve cords which from their somewhat wavy



Fig 675—The disphidith ghth ki rum d t ly be th
th se d th d p p oc d pa sed f d d y
light p ard d ct By ting th fi g f ea h h d th k
th p g f th dl th gh th t ly be f lt
d co t ll d

course bear a faint resemblance to a horse's tail and hence are called *cauda equina*. The bundles of the cauda equina diverge lightly (Fig 676) leaving a small triangular space free which is filled with spinal fluid and this is the space which we wish to enter. If the needle has been kept exactly in the median line the clear spinal fluid will trickle or flow freely from the needle as soon as it has arrived at its destination (Fig 677) and there will be no pain. If however the point of the needle has deviated a sharp pain lancinating into one leg or the other indi-

made in the *second or third intervertebral space*. In order to find the desired spot the patient is instructed to bend her body forward as far as possible thus arching her back and a sterile towel is held between the crests of the hip bone the edge of the towel crosses the spinous process of the fourth lumbar vertebra (Fig. 674). It is now an easy matter to palpate the spinous



Fig. 674—The dorsal process of the fourth lumbar vertebra crosses the top of the towel placed between the buttocks. On the right thigh the right hand palpates the point.

process of the third and second vertebrae unless the patient is very fat. The puncture is made in the midline and immediately beneath the spinous process. The needle is thrust with some force through the skin and the thick interspinous ligament underneath. After this resistance is overcome the needle is pushed in a forward and *crystalline* upward direction through a space the *recessus ligamentiflorus* which is filled with fat and

containing 3 c c of the novocain solution is snugly attached to the needle and by drawing up 5 or 6 c c of spinal fluid the novocain solution is thoroughly mixed and diluted and then *very slowly* reinjected by a corkscrew like twist of the piston (Fig 678). The injection finished the needle is pulled out and the small puncture hole in the skin closed with cotton and collodium if there is any seepage. The patient remains sitting but no longer bent forward for five more minutes and is then laid down slowly. The object of waiting is this. The greater portion of the novocain is absorbed and held fast by the nerves of the cauda

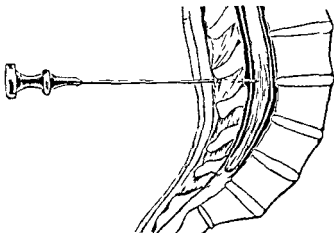


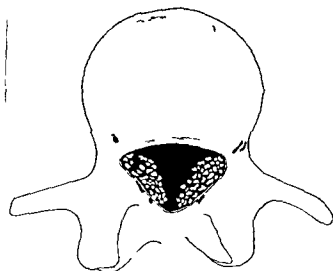
Fig 67—The distal (R d f l m)

equina in the immediate vicinity of the injection. What is left of the novocain diffuses into the spinal fluid and when it finally reaches the medulla it is too diluted to do any harm or paralyze the breathing center.

The whole procedure has been quite painless as you have noticed. Occasionally a very sensitive patient may complain of the prick of the needle in the skin and there is no objection to infiltrating the site of the injection with a drop or two of a $\frac{1}{2}$ per cent novocain solution.

The first effect of the injection is numbness of the legs which

cates that a nerve fiber of one of the bundles has been pierced. The needle should then be withdrawn a very short distance and pushed in again this time exactly in the midline. If the escaping fluid is bloody the needle must be pulled out altogether and re-



Ligamentum Fl.

Recessus Ligament. Fl.



Fig. 66—Diagram of the posterior arch of the dens. The diagram shows the posterior arch of the dens, the ligamentum flavum, and the recessus ligament. The diagram is labeled with the following text: 1. f. th. sec. d. h. d. 2. f. th. p. l. col. in. h. 3. q. d. ge. l. h. l. 4. f. ee. pa. h. h. fill. d. l. th. b. o. 5. p. nal. liq. Tl. l. igh. 6. ce. ff. d. by. h. h. d. l. sa. gl. l. 7. f. lt. f. h. cedl. g. d. d. in. h. ma. h. F. 675.

inserted in another intervertebral space. If the needle takes the bone either the back as not arched enough or the needle not inserted directly beneath the spinous process, reinsertion may then become necessary.

After a small amount of spinal fluid has escaped the syringe

After five minutes in the sitting posture we lay the patient down *slowly* but put several pillows under her head so that the cervical spine is bent forward. The patient is now ready for the final preparation of the field of operation this being done the foot end of the table is raised and the operation can begin about fifteen minutes after the injection has been made.

After the incision has been made two noteworthy features at once become apparent. The abdominal walls are more fully relaxed than with any other method of surgical anesthesia so that retractors are employed with much greater ease and the abdominal parietes escape a good deal of bruising. Then too the intestines remain quietly within the peritoneal cavity—the French have coined the term abdominal silence for this behavior this prevents brusque handling of the viscera frequently obviates the use of packs and generally renders operative manipulations easier. All this tends to lessen the operative shock and as nerve impulses do not reach the brain spinal anesthesia is the ideal measure of anoci association. You may have been surprised at the calmness and lack of interest on the part of the patient. If the case has been properly selected according to the principles which I shall propound presently no psychic shock need be feared.

I have given the technic in great detail because the success and safety of spinal anesthesia depends on it to a great extent. To be sure there is a certain percentage of failures in this as in any other method but with growing experience these diminish steadily. If occasionally a few whiffs of ether are required either in the very beginning or at the end of a tedious operation I see no special disadvantage in it on the contrary this very small amount of ether acts as a stimulant rather than a depressant. During its experimental stage when technic and dosage were equally undetermined spinal anesthesia may have caused a good many fatalities. Today with a mortality of 0.1 per cent it is probably no more dangerous than ether narcosis but as long as there is any mortality spinal anesthesia should not be used in trivial operations where local analgesia would do as well. In its latest analysis spinal anesthesia itself is a form of local

soon followed by inability to move them. This is often the only effect noticeable. The pulse remains regular and strong. There are however cases where a very marked and sudden lowering of the blood pressure occurs. In former years instances of collapse were not infrequent. Painstaking attention to detail, prevention of unnecessary loss of spinal fluid, slow injection of the diluted novocain solution, etc. have rendered complications following injection decidedly less frequent. It is largely a matter



Fig. 68.—The patient lying on the table, before the deep infiltration is made. The patient is lying on the table, and the medical professional is performing the injection. The patient's head is turned to the left, and their arms are resting on the table. The medical professional is leaning over the patient, focused on the injection site.

of practice and one and the same person should always perform the injection. I prefer to do it myself. In the large German clinics a peculiarly assiduous detailed technique exists. With all possible care it is difficult to deny that the sudden drop in blood pressure is almost inevitable. It is therefore essential to keep an assistant on hand so that a hypodermic injection of 5 drops of adrenalin may be given should the pulse become weak or the patient faint. Nausea, thirst, vomiting is of fairly common occurrence but as a rule is fairly quickly

more often absent nourishment is taken without difficulty by most patients a few hours after operation. I have had several patients with experience in both methods of anesthesia who upon a third occasion demanded another spinal anesthesia. The only drawback to spinal anesthesia as I see it is the occurrence of postoperative headaches in about 30 per cent of the case. The cause of this annoying symptom is still obscure and its course sometimes protracted for a week. Among my ward patients I have seen it much more rarely than in private patients. On the whole its frequency has decreased since adhering strictly to the technic demonstrated before you.

anesthesia While in every inhalation narco is the poison enters the circulation and produces undesirable toxic effects on the lungs heart and kidney in spinal anesthesia the greater part of the poison is deposited around the site of injection as I have mentioned before and is thus rendered harmless This is the reason why we may employ spinal anesthesia with advantage in this case in which there are demonstrable lesions of the heart and kidneys it is also the reason why patients with pulmonary trouble with high blood pressure or diabetes are particularly suitable subjects and it is a well established experience that aged people stand a spinal anesthesia when they are apt to succumb to the immediate or delayed effect of an ether narcosis Even in the absence of organic or systemic disturbances spinal anesthesia reduces appreciably the risk in operations which are burdened with a high mortality such as operations for cancer or fibroids but I do not go as far as those who prefer spinal anesthesia to inhalation narcosis in all laparotomies because I firmly believe that any routine method endangers the rights of the patient to individualization There are in fact certain conditions in which spinal anesthesia is positively contraindicated These are briefly hypotension diseases of the central nervous system shock sepsis and fevers of unknown origin lymphocolia and other anomalies of the spinal column or cord contraindication against the method neuropathic disposition tendency to headaches and urticaria and eruptions near the site of injection

In the meantime the operation has proceeded satisfactorily The tumor weighing 14 pounds has been removed by a typical panhysterectomy and the umbilical hernia has been ligated

As you see the patient has slept soundly for more than an hour and exhibits no signs of apprehension I have no objection to giving the patient a cup of tea or black coffee if he complains of thirst and I often carry on an anesthetic with the whole day my work I may say here that the first treatment differs in no wise from the customary method It is however noteworthy that experienced nurses throughout the spinal cases endeavor to take care of the thirsty patients The general behavior of such patients is little different from

ENUCLEATION OF FIBROIDS COVERING OF RAW SURFACES UPON FUNDUS WITH PERITONEUM

WHILE in the first case uterus and adnexa were removed with the tumor the next 3 patients are young women ranging in age from twenty eight to thirty four in whom only the fibroids have been enucleated and the genital organs left behind so as to preserve the menstrual function and enable them to bear



Fig 679—H g d t r l th fib d ly h l d t (F m
Op t (y ækol g b D d l d K g)

children. The desirability of such conservatism need hardly be justified. It goes without saying that only subserous and interstitial fibroids can be dealt with in this manner provided they are not too numerous. The technic offers no particular difficulty. Fibroids have a so well defined capsule that they are easily helled out (Fig 679). The danger comes from subsequent

eventually force the uterus backward and cause a fixed retro flexion

These unpleasant sequelæ of an otherwise useful operation can readily be prevented by adding to the enucleation a procedure

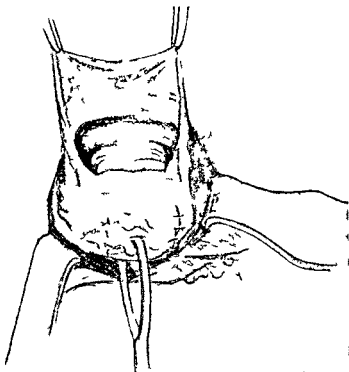


Fig 681—l h bl dd pe m l bc p h d ff th ce d
h ld d be fl d th f d N t th bl dd th
d ; h f th d

which I have described in detail some years ago (Amer Jour Obst and Gyn 1920 : 262) The fundus is grasped by a tenaculum and pulled backward and upward in the direction of the promontory The reflection of the bladder peritoneum upon the cervix which has become plainly visible is incised transversely as in a hysterectomy and pushed off from the uterus (Fig 681)

hemorrhage and suppuration in the wound beds of the tumors and it is therefore necessary to ligate every bleeding vessel and to carefully draw the wounds together with a fine running catgut stitch in order to obliterate every dead space (Fig 680). This being done a subcutaneous injection of ether should be given and the uterus should be kept firmly contracted for several days by repeated doses of the same drug.

After the operation the uterus bears one or more sutured wounds to which omentum or intestine might readily adhere.



Fig 680.—After the operation of fibroid removal, the uterus is shown with the sutured wound. The diagram illustrates the surgical site and the placement of the suture.

In such a case until a definite result is obtained to relieve the pulling sensation in the upper part of the abdomen, gastro-intestinal disturbance of various degree and more or less ill-defined pains occur and eccentric uterine like phenomena are not uncommon. On the part of the uterus the abnormal attachment of loop of intestine with a varying amount of tension leads to decreased mobility of the organ and its further development to menstrual disturbance. The continuous pull exerted by the structure located behind may

The question Is the function of the bladder disturbed after this procedure? will at once suggest itself to you In the eight or nine years that I have employed this method I have *never* observed instances of vesical disturbance other than those that may

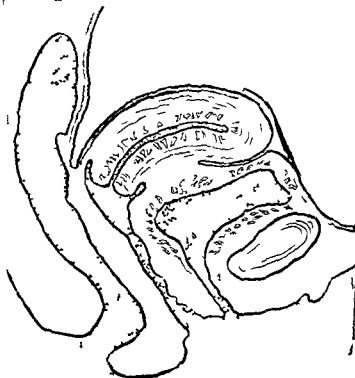


Fig 683—A diagrammatic view of the postoperative condition of the bladder and uterus after the enucleation of fibroids. The diagram shows the bladder and uterus in their relative positions, with the bladder situated below the uterus. The diagram is labeled with 'Fig 683' and 'A diagrammatic view of the postoperative condition of the bladder and uterus after the enucleation of fibroids.'

follow any laparotomy. A moment's visualization of the condition created will supply the theoretic explanation of the absence of postoperative complications. The relations of the uterus and bladder are not essentially altered. The uterus still lies on top of the bladder. Only the peritoneum which at this

If this blunt dissection with the finger is gentle enough and does not extend into the broad ligaments the bleeding is usually insignificant and is quickly checked by the pressure of a sponge. The uterus is then tilted forward the bladder peritoneum is pulled over the uterus and stitched to the posterior aspect of the fundus where an intact peritoneal surface presents itself (Fig. 682). In small uterus the bladder peritoneum may be fastened as far back as the insertion of the sacro-uterine ligaments and in this connection it is often amazing to see how

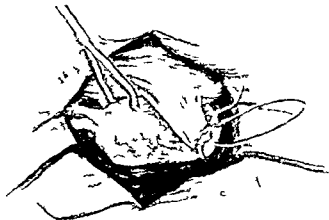


Fig. 682.—The peritoneum is pulled over the uterus and stitched to the posterior aspect of the fundus.

much the size of the uterus is reduced after one or more fibroids have been enucleated and the uterine muscle contracts firmly. After the first few turns of this continuous catgut suture the tenaculum is removed and the suturing continued until the entire fundus with its raw areas has disappeared beneath its new peritoneal covering. By using an inverted stitch even the catgut knots become invisible. The newly formed covering consists only of the bladder peritoneum which in many cases is so thin and transparent that the suture lines and tenaculum holes may be distinguished.

TREATMENT OF FIBROIDS WITH RADIUM

IN discussing the various methods of treatment for uterine fibroids we must bear in mind that an operation is required only in from 30 to 40 per cent of the cases. The great majority can be cured by means of radium. Such a statement would have met with ridicule a few years ago. Today it is an indisputable fact. It has been proved by thousands of cases that the hemorrhages can be checked with certainty and that from 70 to 80 per cent of the tumors will shrink in size. The very small percentage of failures in the past has been due to injudicious employment of radiotherapy and can be avoided by a proper selection of the cases. It is therefore of prime importance to know when to operate and when to use radium. In a very general way it may be said that women under forty should be operated upon in the hope of preserving the ovaries and as far as possible the uterus. In women over forty radiotherapy is the method of choice. Both these indications are subject to certain exceptions. Thus in younger women radiotherapy should be substituted for operation if there be any complication present that forbids or seriously handicaps surgical intervention likewise if the patient positively refuses operation. In women over forty on the other hand operation is indicated if the tumors are of excessive size if they are of the pedunculated subserous or submucous variety or if they are complicated by any form of degeneration or associated with adenoid degeneration. This leaves in women of this age the cases with interstitial or sessile subserous fibroids—a category which as you perceive constitutes by far the majority of our fibroid cases.

The method of treatment is by intra uterine application. The uterus is dilated during a short nitrous oxide oxygen anesthetic or a morphine scopolamine semianesthesia and a curettage is performed to exclude coexisting malignancy. The radium contained in saline capsules or steel or gold needles and placed in the uterine cavity. A thin tube of pure rubber is then introduced

point is loosely connected with the bladder is stretched and pulled across the fundus (Fig. 683). The bladder at the border of the posterior and upper walls may adhere to the uterus a little higher than usual but still on its anterior aspect. Hence the filling of the bladder will cause neither subjective nor objective disturbance.

The same freedom of the bladder obtains in pregnancy when the gravid uterus may rise into the abdominal cavity without displacing the bladder more than is the case normally. I have in mind the case of a woman of thirty-one years who after several years of married life consulted me on account of her sterility. I found the uterus enlarged to the size of a man's fist by multiple fibroids and on operation removed one intramural and four subserous fibroids ranging in size from that of a walnut to that of a moderately large apple. After the wounds had been drawn together carefully the uterus which now had attained normal size was tucked beneath the bladder peritoneum in the manner just described. Eight months later the patient conceived and carried her child to spontaneous full term delivery without bladder symptoms of any kind.

On re-examining patients on whom this finishing touch has been done for which I propose the name vesicofixation the normal position and mobility of the uterus are pleasantly found to record. Parenthetically I may add that I have found frequent use for this procedure after operations for bled retroflexion or tubo-ovarian tumor.

been no bleeding since. I do not know how large the tumor was at the time of the operation but when I saw the patient thirty or more years later she still had a multinodular mass almost as large as a man's head in her abdomen. The artificial menopause then had not sufficed to materially reduce the size of the tumor.

Contrast with this the following 3 cases.

A lady of forty six was referred to me for myomectomy. The tumor reached to within 2 fingerbreadths of the umbilicus and consisted in the main of two growths of which one was interstitial the other more subserous. The bleeding was abundant and persistent in spite of styptics ice bags etc. The hemoglobin was 50 per cent erythrocytes 1 500 000. Shortness of breath and renal casts still further complicated the clinical picture. Contrary to the expressed preference of my consultant for operation I employed the combined radium and x ray treatment with the result that the hemorrhage ceased promptly the large tumor shrunk to little more than the size of a man's fist and the patient recovered her health completely—all within the short time of four months. The diminution of the tumor continued and when I last examined the patient one year after the treatment the uterus had returned to normal proportions.

The beneficial effect of radiotherapy was even more pronounced in the second case. The patient forty eight years old suffered from excessive hemorrhages and presented the picture of so profound an anemia that operation was out of the question. The tumor was an interstitial fibroid and extended upward to within 2 fingerbreadths of the umbilicus. An intra uterine treatment of 1200 m_g of radium followed within the next days by two exposures to the x rays not only checked the hemorrhages but reduced the uterus to absolutely normal size within thirty days.

An unmarried woman of forty six was assigned to my service in another hospital for the removal of a fibroid tumor extending 2 finger breadths above the umbilicus. While the size of the uterus demanded an operation the general condition forbade surgical intervention as the patient had chronic cardiac valvular disease arteriosclerosis marked debility and a beginning

well up into the uterine cavity. The rubber hose of a fountain pen is particularly well suited for this purpose (Fig. 684). The usual dosage is 1200 milligram hours—that is to say 100 milligrams of radium are left within the uterus for twelve hours. It goes without saying that extreme aseptic care must be observed. We disinfect the radium applicator by placing it first in pure carbolic acid and afterward in alcohol.

The intra uterine radium treatment should be supplemented by a series of x-ray treatments.

Just how the radium produces the desired effect is still open for discussion. The prevailing view is that the radium rays destroy the graafian and primordial follicles and thus bring about an atrophy and loss of function of the ovaries. The term



Fig. 684.—The use of the applicator for the treatment of the uterus by radium.

bloodless castration has been used to express this action of the radium. The artificial menopause thereby created leads not only to cessation of the uterine bleeding but affects the size of the tumors by a premature atrophy.

This explanation is undoubtedly true but it is not sufficient and I have come to believe that in addition to the action upon the ovaries there is also a specific effect of the radium upon the tumor tissue. A few observations made within the last year will prove my point.

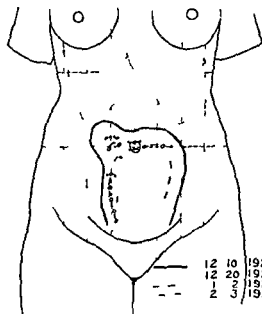
A lady of sixty-eight years of age had up to her fibroids more than thirty years ago. At that time hysterectomy was generally considered too hazardous an operation and therefore only the ovaries were removed with the result that there had

HEMATOMETRA DUE TO RADIUM

THE marvelous results accomplished with radium should not let us lose sight of the fact that radium is a mysterious agent of which after all we know very little. We are working with a force which does an enormous amount of good but may be productive of a great deal of harm. Fistulæ and more or less serious injuries to neighboring organs were the toll we had to pay for the crude empiricism which characterizes every new method and even now that our eyes are open to the possibility of danger a word of caution is not out of place. Only within the last six months I had occasion to observe in 2 cases a complication which has hardly been mentioned in the literature on radium.

The first case concerns a childless woman of forty two years who had suffered all her life from intense dysmenorrhea. Medicinal and local treatments repeated dilatations and curettages were of no avail and even the removal of one ovary gave her only a temporary relief. She now wanted the other ovary removed and I proposed to eliminate it bloodlessly by radium. Dilatation was extremely difficult on account of a fibrous stenosis of the internal os. Because of that the rubber tube with the radium may not have been pushed well beyond the constricted portion. At any rate four weeks after her return to her home in a distant state she was seized with excruciating pain in the lower abdomen which not even morphin injections could fully relieve. After three weeks of intense suffering she returned to St. Louis. I found a uterine tumor about the size of a grapefruit obviously a hematometra. The condition was only too clear. The burn which follows every intra uterine radium application had led to a complete closure of the stenosed cervical canal and the one and only menstruation which she had after the treatment had filled the uterus with blood. It was a simple matter to dilate the atresia and to keep the canal open for a few weeks. The uterus no longer shrank rapidly there has been no return of the menstruation.

psychosis. This patient merely received an intra uterine radium treatment without any x rays and the rapid shrinking of the tumor can best be demonstrated by a glance at the accompanying sketch (Fig 685). Two months after the treatment when the tumor had already lost about one third of its original size the patient had to be transferred to an insane asylum and I have since lost sight of her.



F 685—Th l h th ma kall d m f tl fib o d
th gh ls fl g h d m m

The feature common to these 3 cases is this. All 3 patients had large tumors. In all 3 the menstruation ceased or was very scanty after the treatment it could not be restored but with a scant amount. The tumor however had a decided shrinkage even before the menopause and definitely. This is a very important fact that there is a specific effect of the therapy upon the tumor tissue in addition to the effect produced by the destruction of the ovarian function.

ordinarily sterilized milk in quantities ranging from 5 to 10 c c was injected at intervals of three days into the gluteal muscle. Much to our gratification the general condition improved almost from the beginning the appearance and behavior of the patient approached that of a healthy person pain and fever disappeared and the uterine tumor decreased visibly in size. After seven injections the fundus was half way between umbilicus and symphysis and today that is to say about five weeks after the first treatment the body of the uterus has returned to almost normal dimensions.

This surprising absorption of a cancerous pyometra which exceeded my keenest expectation is I believe a unique observation.

Addendum—The improvement in this case lasted several weeks. The cervical cancer then began to grow again and rather rapidly led to the death of the patient.

and from her letters I learn that for the first time in her adult life she is enjoying undisturbed health.

The second case I can demonstrate to you today. This patient came to the hospital in a deplorable state from an inoperable cancer of the cervix. She received a radium treatment of 2640 mg. 110 m. radium being embedded in the cervical growth. There was a short initial improvement but three weeks later she was taken with chills and fever and he noticed a painful swelling in her lower abdomen. Examination at that time revealed a tumor rising from the pelvic cavity as high as the umbilicus. Her temperature was 102.5 F. she had a white count of 17,600 and the general condition seemed desolate. The diagnosis of pyometra was obvious. The cauliflower of the cervix had melted away after the radium treatment. In its stead there was now a mass of cicatricial tissue and though I tried for quite a while I did not succeed in finding an entrance to the uterine cavity.

You will appreciate the difficulty of the situation. Hysterectomy was out of the question neither could I unduly prolong the narcosis in this cachectic and thoroughly toxic patient.

Under these circumstances I resorted to foreign protein therapy in the hope of improving the general condition of the patient and rendering the seemingly inevitable end somewhat easier. This is not the place to speak in detail of the uses of foreign protein therapy in gynecology. I have discussed these elsewhere (Journal Missouri State Medical Assoc. 1922 19:341). It may suffice to say that proteins injected intramuscularly have the faculty of stimulating the cells of the body to greater protoplasmic activity. Thus peptains in particular to those cells which have become weakened by bacterial invasion. Under favorable circumstances the affected cell may recover their natural powers of defense in other words the protoplasm again develops phagocytic properties the toxins are neutralized by a fresh introduction of ferments and antibodies the local metabolism intensified and the process absorbed.

Of the various proteins recommended for this purpose I have been employing milk with success for some time past.

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